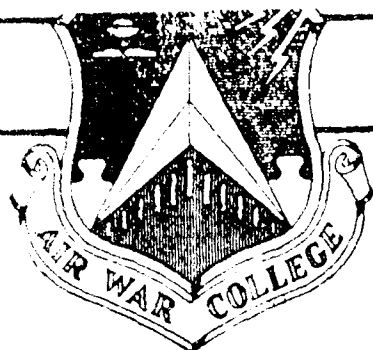


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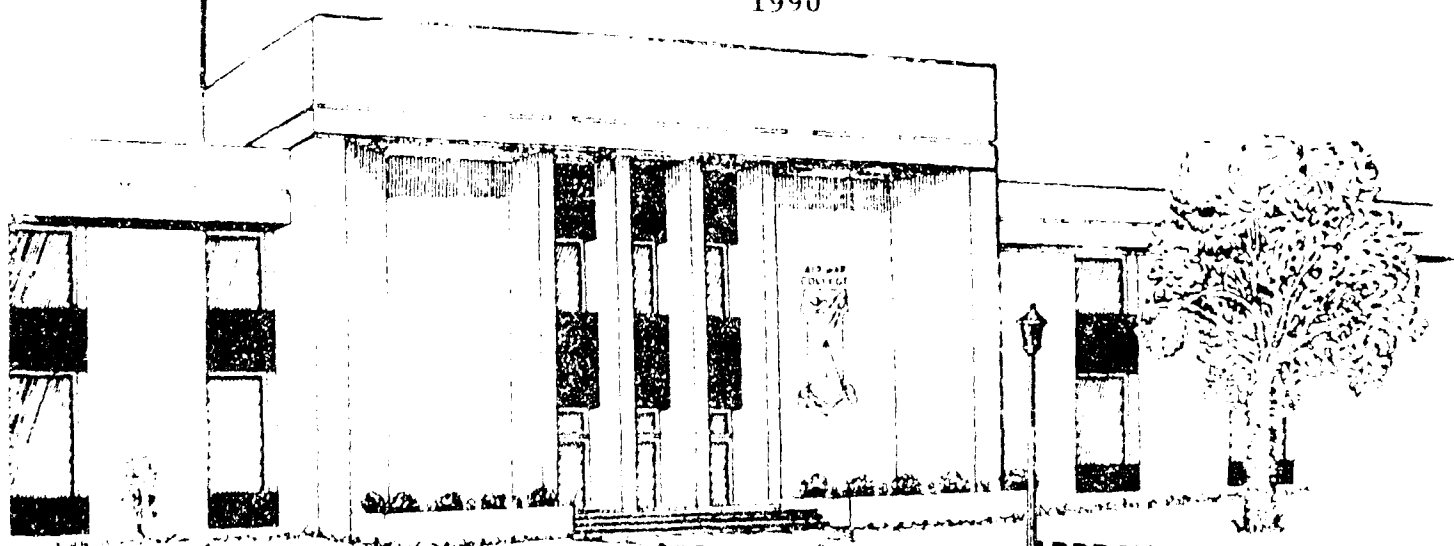
RESEARCH REPORT

AIR FORCE ACQUISITION STABILITY
AND THE PROGRAM MANAGER

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LIEUTENANT COLONEL JOHN L. CLAY

1990



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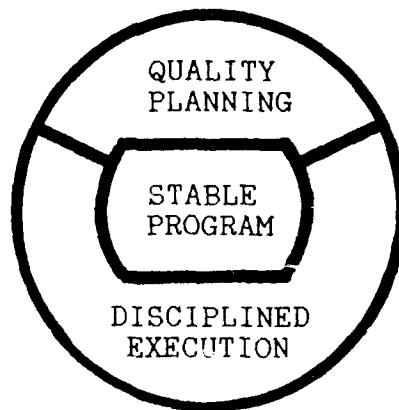
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AIR FORCE ACQUISITION STABILITY AND THE PROGRAM MANAGER

by

John L. Clay

Lieutenant Colonel, USAF



A DEFENSE ANALYTICAL STUDY SUBMITTED TO THE FACULTY

IN

FULFILLMENT OF THE CURRICULUM

REQUIREMENT

Advisor: Colonel Robert E. Cochoy

MAXWELL AIR FORCE BASE, ALABAMA

May 1990

DISCLAIMER

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EXECUTIVE SUMMARY

TITLE: Air Force Acquisition Stability and the Program Manager

AUTHOR: John L. Clay, Lieutenant Colonel, USAF

This study answers the question, "How can the Air Force program manager (PM) improve weapon acquisition stability?" By analyzing acquisition in terms of stability, current weapon procurement problems are better understood. A stable acquisition program is defined as one which has both quality planning and disciplined execution. The instability of Air Force weapon programs is described and documented as a significant deficiency.

Fourteen causes of instability, affecting both planning and execution, are described. Included are problems of faulty requirements, strategy disconnects, persistently optimistic estimates, ambiguous plans and objectives, inadequate skills, floating baselines, distraction, and turbulent budgets.

Five recommendations are presented which, if adopted by the PM, will improve program stability. They are titled, quality requirements, realistic estimates, plan education, total quality management and contractor commitment.

The study does not present any revolutionary solutions to acquisition deficiencies; rather it analyzes the problem from a new perspective and provides a framework for implementing proven management concepts.

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CHAPTER I

INTRODUCTION

. . . program instability (large unplanned changes in program funding and/or schedule) is the major causative factor of cost and schedule growth.

1

AFSC Affordable Acquisition Approach

Purpose

While a student at Air Command and Staff College in 1984, I studied a recently canceled anti-armor weapon program. My purpose was to identify the causes. A principle finding was that the program suffered from instability--frequent, disruptive changes which caused the erosion of user support. My conclusion was not unique; other studies had also found program instability to be a serious acquisition problem. Five years later, much is still being said and written about weapon acquisition instability. It continues to be a significant concern with little evidence suggesting a trend towards improvement.

This study also addresses the problem of Air Force (AF) weapon acquisition instability. However, the main purpose is not to document the effects (although Chapter II will cite several studies which do this). Rather, the goal is to recommend actions for a key participant in the process, the

program manager (PM). Specifically, the following question will be answered: How can the PM improve weapon acquisition stability?

This introductory chapter provides definitions, additional problem discussion and a study outline.

Definitions

Weapon acquisition: The process of developing and procuring systems for military use.

Acquisition stability: The degree to which essential planning expectations, in particular those associated with performance and support objectives, resources, and time, are realized as the weapon is acquired. Stability depends on the quality of the planning and the discipline of the execution.

Program manager: Individual responsible for the acquisition of a weapons system; for a major program in Air Force Systems Command, this is the system program director.

Stability and Acquisition Management

As a career acquisition officer, I am often asked to explain what can be done to improve AF weapon system development and procurement. Little wonder. We hear about schedule delays, cost growth, overpricing, and fraud, waste and abuse. Stretchout, goldplating, pork barreling, micromanagement, mismanagement and buy-in are terms frequently used. Further, every actor in the acquisition process seems to have some complicity in the problem including the contractor, the buying office, the headquarters, the Department of Defense and the Congress. Acquisition problems are very complex and

thus providing a succinct answer to this well intentioned question is difficult. But perhaps there is a brief response which captures much of the opportunity for improving the process: "make programs more stable."

Earlier I provided a definition of "acquisition stability" which notes that "Stability depends on the quality of the planning and the discipline of the execution". This claim is unlikely to stimulate disagreement yet it embodies most of the solutions to current acquisition problems (as will be substantiated in chapters II and III). To elaborate, stability requires two conditions. First, the program is initiated with accurate and reconciled assumptions concerning user performance and support requirements, the current and near term technological capabilities, the availability and timing of resources (budget, manpower, facilities), the legal and regulatory constraints, and the time required to accomplish all tasks. "Reconciled" means that the assumption inputs are logically integrated. This logical integration of accurate assumptions is, of course, the plan. The second condition for stability is that once the plan and the program are approved, the assumptions hold--that is, the program is² executed according to the expectations of the plan. Again, program stability is a situation where a quality plan is being followed. "Instability", on the other hand, is a condition of acquisition program turbulence due to either changing planning assumptions, undisciplined execution or both.

As it relates to acquisition problems, the simple notion of instability as the cause--and stability as the solution--is not very satisfactory. Of course, the causes and solutions are more complex. However, a focus on stability provides a valuable perspective for identifying these causes and solutions. Viewing acquisition in terms of stability is a useful frame of reference for analyzing the weapon acquisition process.

For example, initiating a program with an unrealistic schedule will create an "instability" when the real schedule becomes apparent. A program which receives less than planned funding must deal with "budget instability". In either case, the effects are undesirable. The unrealistic schedule estimate and the unanticipated lower funding were separate problem causes but each has the common effect of creating instability. Instability is often the common denominator of defense acquisition problems.

The preceding discussions suggest that "stability" may be viewed as a principle. One may look at "stability" as a principle of acquisition in the same way that "maneuver" or "unity of command" are principles of war. Military strategies are analyzed against principles of war. The principle of "stability" can be used to analyze the quality of acquisition management. In theory, unsuccessful military strategies often overlook simple principles of war. Acquisition failures often violate the principle of "stability" as will be discussed

later. Military strategies have proven successful even though some principles were violated. Some programs may be successful despite instabilities; however, instability generally limits program success.

Program Instability: A Problem Worth Solving

The problem statement, "Can the PM improve weapon acquisition stability?", inherently assumes that instability is undesirable. In the decade of the 1980s, much has been written about improving program stability as a prime solution to acquisition problems. In the second chapter, I will summarize several studies which echo this. Indeed, almost every major study since 1979 addressing general Department of Defense (DoD) weapon procurement problems includes some recommendations targeted at improving stability. Using several of these previous studies as a departure point, this analysis assumes that more stability in the weapon acquisition process is needed. It builds on previous studies by recommending actions within the power of the PM to enhance stability.

The legendary baseball figure, Yogi Berra, once proclaimed the self-evident: "If you don't know where you're going, you may end up somewhere else". In Fiscal Years 1990 and 1991, the estimated AF acquisition budgets are \$47.4 and \$50.9 billion, respectively. The resources are significant.

By developing good plans and then following them, the AF enhances its prospects for using these resources wisely.

While supporting the development and production of five Air Force programs over almost two decades, I have personally seen neither corruption nor serious problems of over-pricing, such as the well publicized coffee maker, hammer and toilet seat. Most experts will agree that these are not the critical weapon acquisition problems.⁴ Yet, alleged corruption and over pricing receive considerable press and congressional attention. On the other hand, I too often observed instabilities costing millions of dollars--the direct result of changing requirements, unachieved schedules, and unexpected budget reductions. Typical manifestations of instability were stretched program schedules, abandoned capabilities, reduced quantities and frequently renegotiated contracts.

Finally, a simple analogy illustrates why the PM should strive to maximize stability. Half way into the construction of a new home, you or I would not tolerate the builder who announced a big cost growth, the banker who reduced the amount of a loan commitment or the spouse who insisted on changing the floor plan. Such mismanagement would add substantially to the cost and construction time. Yet these very problems--optimistic estimates, erratic budgets and changing requirements--are all too common in weapon acquisition. The PM should be motivated to achieve program stability.

Other Comments

To complete this introductory section, several other general comments are appropriate.

The context of the study is AF weapon acquisition because of the author's experience and affiliation. However, the analysis and recommendations should have applicability throughout the DoD.

The study will recommend actions that the PM can take to minimize instability. Many actors in the acquisition process influence program stability: the contractors, the users, the AFSC Headquarters, the AF Secretariat, the CINCs, the JCS, the Office of the Secretary of Defense and the Congress. However, study recommendations will be limited to actions which are within the PM's ability to implement--what he or she can do to enhance stability.

The analysis will be critical of the weapon system acquisition process. Rightly so, we should probe directly at the problems. However, one can easily argue that this same process produces the best military equipment in the world. The one sided (50 to 0) kill ratio of the F-15s during Israeli-Syrian air combat in 1982 comes to mind. The thrust here is obtain the most military utility from each dollar invested in weapon system acquisition.

Does stability equate to detailed planning and step-by-step execution? Absolutely not. Instead, following the definition provided above, stability requires that essential

planning expectations--in particular those associated with performance and support objectives, resources, and time--be carefully selected, accurately estimated, and then held constant. Stability does not equate to rigid, detailed planning, or obedient, unquestioning execution. In fact, continuous change to process, organization, and internal resource allocation priorities are virtues of effective acquisition programs. Consider the advice of Tom Peters in Thriving on Chaos (I suggest that the "vision" mentioned by Peters is synonymous with "essential planning expectations"):

. . . constant change is thoroughly consistent with pursuing perfection in quality and service... Yes, it is a paradox: In the face of more change, more stability is essential. Charts and boxes and stability based upon lengthy job descriptions and your place in the organizational structure must be replaced by vision, values, and stability based on trust.⁵

This is not to argue that stability is the ultimate imperative. The objective of AF acquisition is to deliver the most effective weapons with the allocated resources. A program which is stable but no longer competitive in terms of contributing to national defense should be changed or canceled. For example, a changing threat can create unavoidable instability. In short, the goal of creating stability is subordinate to (but generally consistent with) the goal of delivering timely, effective, and affordable weapon systems to the operational forces.

Finally, the current political environment is worth noting. The Soviet threat appears to be diminishing. Correspondingly, a period of declining defense budgets is projected for the early 1990s. Public confidence in the defense procurement process has also eroded, particularly as a result of unfavorable publicity concerning spares over-pricing and alleged corruption. Finally, significant improvements to the acquisition process are planned under the leadership of Defense Secretary Richard Cheney. For these reasons, the early 1990s is a period of potential change in defense procurement.

Study Outline

Chapter I introduced the problem, "How can the PM improve stability?" Stability occurs when a quality plan is followed. The analysis of program stability provides a useful frame of reference for identifying acquisition problems and finding solutions. A key assumption is that stability is a desirable characteristic.

Chapter II validates this assumption. Results from major studies conducted in the 1980s are cited as well as expert opinion. Five undesirable affects of instability are described at the end of the second chapter.

Chapter III identifies the major causes of instability. Fourteen causes, or "destabilizers" are organized according to management function: six in planning and eight in execution.

First, however, a model is presented to organize and conceptualize the problem.

Chapter IV offers five recommendations, which if adopted by the PM, will improve stability.

Chapter V summarizes the conclusions and recommendations. An epilogue provides additional observations which are beyond the scope of the problem statement yet of interest to those concerned about program stability.

Notes

1. Air Force Systems Command, "The Affordable Acquisition Approach, Executive Summary," Command sponsored study, Andrews AFB MD, 1983, p. 3.

2. A program's plan is rarely contained in a single, all inclusive document, but rather in a series of documents such as the decision coordinating paper, baseline, program management plan, test and evaluation master plan, etc. "Plan approval" equates to a formal decision (such as a milestone approval) to proceed with a program. DODI 5000.2 provides policy guidance in this area.

3. Department of the Air Force, Report to the 101st Congress, Fiscal Year 1990 (Washington DC: Government Printing Office, 1989), p. 52. Acquisition budgets as shown include research, development test and evaluation (RDT&E) and all procurement appropriations.

4. Many experts agree that corruption and over pricing are not the critical problems. According to Dr. Jacques Gansler, "The Changing Defense Acquisition Environment," Key Speeches, (July 1988), p. 1., "Abuse . . . has, at most, tens of millions of dollars of impact while the "waste"--inefficiency and ineffectiveness--is in the tens of billions of dollars. Likewise, the Blue Ribbon Commission concluded that over-pricing and corruption are not the major defense procurement problems. See The President's Blue Ribbon Commission on Defense Management, A Report to the President on Defense Acquisition (Washington, D.C.: Government Printing Office, 1986), p. 5.

5. Tom Peters, Thriving on Chaos (New York: Harper and Row, 1987), pp. 564-65.

CHAPTER II

THE STABILITY PROBLEM

Program stability--surely a close cousin of Deming's "constancy of purpose"--has long been recognized as perhaps the single most important contributor to efficiency and effectiveness in the acquisition process.

Hirsch and Waelchi

Introduction

As introduced in Chapter I, the problem, "How can the Air Force (AF) program manager (PM) improve weapon acquisition stability?" assumes that weapon acquisition stability is worth achieving. The assumption is a safe one. The ill effects of poor planning and undisciplined execution have been well documented in the last decade. No new data needs to be introduced as part of this analysis. In the pages which follow, I will summarize several studies and expert opinions describing the severity of the problem. This will be followed by a section which describes five consequences of instability.

It may be of some comfort to know that instability is not unique to the current environment. The following history illustrates that early AF pioneers experienced the problem:

When Schriever was selected to manage the ICBM program in mid-1954, it had suffered through a checkered history marked by stop-and-go development, unrealistic requirements, divided authority, low priorities, and indecision as to whether emphasis should be on ballistic or winged missiles. . . .2

Studies and Initiatives

Whether programs of the 1950s saw more or less turmoil than their counterparts in the 1980s is beyond the scope of this analysis. However, the last decade witnessed a number of studies calling for improved acquisition stability. Several are cited in this section. Each suggests an unfavorable trend towards more acquisition instability.

Rand 1979 Acquisition Policy Study. The Rand study was one of the earliest if not the first to specifically emphasize the need for more stability. Rand provided an assessment of the Department of Defense (DoD) acquisition policies of the 1970s. The authors noted that existing policies did not address the problem of ". . . frequent changes in a program's budget and schedule." Yet these changes were perceived by many to be among the most serious deficiencies in the acquisition process.³ The study recommendations included the following:

After approval of an acquisition plan, and especially after initiation of full-scale development, any significant changes imposed on the plan, such as additions to the proposed system capability, or modifications in milestones or funding schedules, can cause major cost increases and schedule delays. To improve the efficiency of the acquisition process, such changes should be strictly limited, unless dictated by technical difficulties, unacceptable test results, or changes in the need for the system.⁴

Defense Acquisition Improvement Program (DAIP). Also known as the Carlucci Initiatives, the DoD established 32

actions in 1981 to improve the acquisition process. One of these, number 4, was specifically designed to stabilize budget fluctuations; it directed the services to justify any changes between program baseline funding and current year budget recommendations. In the semiannual progress report, the Deputy Under Secretary for Acquisition Management observed,

A major portion of the ultimate success of the Acquisition Improvement Program can be directly related to the degree to which programs are stabilized. Although some progress has been made, significant problems remain.⁵

Affordable Acquisition Approach. The "A3" study was sponsored by Air Force Systems Command in 1983 to investigate what could ". . . be done to shorten the process or procure systems at a lower cost" The study team reviewed cost and schedule histories of 109 acquisition programs. They noted trends toward longer acquisition times, decreasing production quantities and increasing program costs. The team concluded that, compared to the past, technical problems were less likely to be the cause of cost and schedule growth. At the same time, factors such as "external management impact" and "funding instability" were being cited with more frequency.⁶ Moreover, the A3 study established,

. . . that program instability (large unplanned changes in program funding and/or schedule) is the major causative factor of cost and schedule growth.⁷

To reiterate, the principal problem is program instability caused by funding instability, requirements instability, and technical problems,

and all three are interdependent. Very seldom does one factor appear without the others.⁸

The Affordable Acquisition Approach findings are illustrated in Figure 1.

Cancellation of the Wasp System--Program Instability and Other Lessons. Wasp was an antiarmor program which enjoyed user support in the late 1970s but was subsequently canceled. As a student at Air Command and Staff College in 1984, I investigated the reasons for its termination. The Wasp program successfully completed concept definition/exploration. The plan for the demonstration/validation phase was reviewed and approved at a formal Milestone I.⁹ However, there were subsequently significant modifications to the technical approach and in each of four successive annual budget cycles the funding plan was measurably changed. Figure 2 shows these budget fluctuations. The Wasp program, eventually canceled in 1983, was an excellent case study of instability.¹⁰

The President's Blue Ribbon Commission on Defense Management. In 1986, President Reagan established this Commission for the purpose of recommending improvements to the DoD's acquisition process. His motivation was largely due to eroding public confidence in view of "... overpriced spare parts, test deficiencies, and cost and schedule overruns." While the Commission found few instances of fraud and dishonesty, it concluded that the defense acquisition process¹¹ has "basic problems that must be corrected."

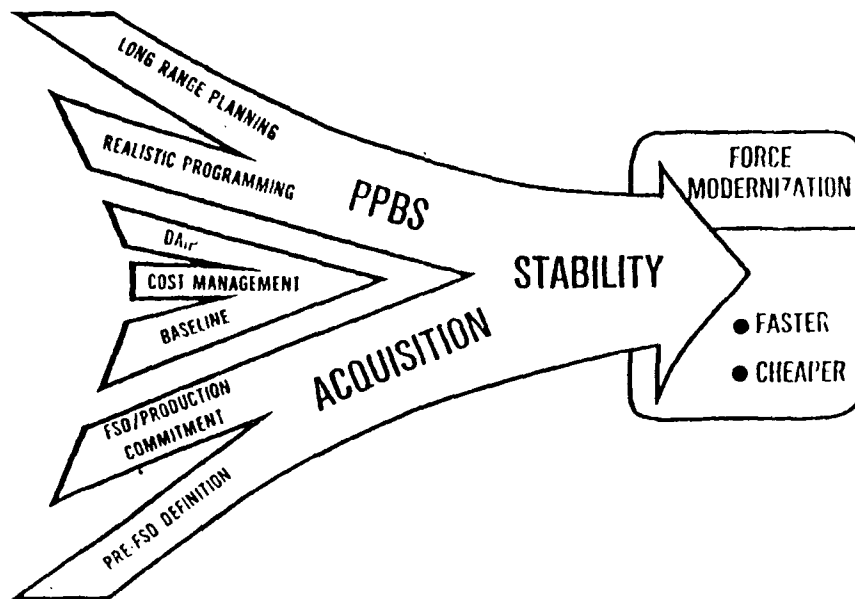


Figure 1. A3 Study. Extracted from the cover of the AFSC Affordable Acquisition Approach Executive Summary, stability is shown as the means to modernize "faster" and "cheaper".¹²

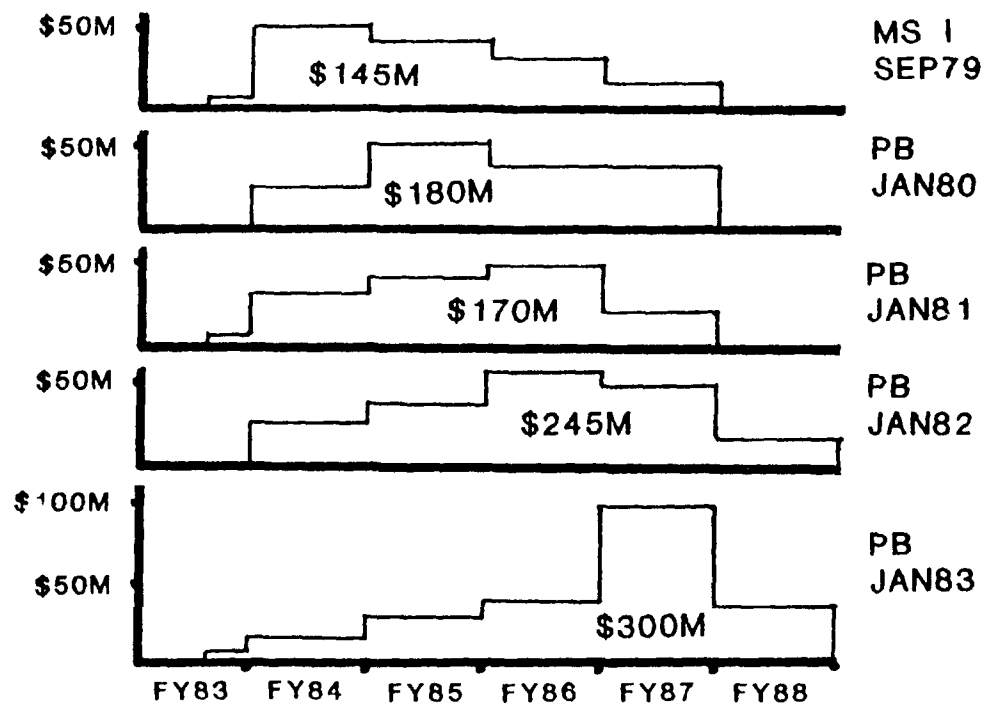


Figure 2. Wasp Instability. The Wasp budget profile at Milestone I (MS I) is compared to four subsequent President's Budgets (PB) in constant FY 1979 dollars. The "y" axis shows programmed funds, by year, in each plan. Funding was progressively pushed to the out years; the estimated total cost grew from \$145 to \$300 million.¹³

The Commission suggested that DoD "emulate" a management model which incorporates successful features found in "outstanding commercial programs". "Stability" is identified as one of these features. Stability exists when the "manager" and the "board of directors" operate in a disciplined manner. The former promises to achieve planned program objectives (performance, cost, schedule) and the latter commits to providing the resources and other support needed for program execution. The manager is motivated to achieve success; as long as progress is satisfactory, the board of directors provides the planned funding and protects the manager's prerogative to exercise authority and control.¹⁴

Not surprisingly, the Commission strongly recommended that DoD enhance program stability. Part of this recommendation is provided in the following paragraph. The term "baseline agreement" is of course synonymous with a top level "plan". Once the baseline is approved, the program manager and the acquisition executives have responsibilities to see that it is followed. As discussed in Chapter I and echoed here, stability requires that a quality plan be developed and then followed.

. . . the program manager should prepare a brief baseline agreement describing functional specifications, cost, schedule, and other factors critical to the program's success . . . Within the terms of this agreement, the program manager should have full authority to execute the program. He should be fully committed to abide by the program's specified baseline and, so long as he does so, the Defense and Service Acquisition Executives should support his program and permit him to manage it.¹⁵

National Security Review (NSR-11). In February 1989, the President directed that the Secretary of Defense complete a plan for improving the acquisition process and fully implementing the recommendations of the Blue Ribbon Commission.¹⁶ The President's direction was formalized in NSR-11, which specifically notes that the Commission's recommendation for "Stable program funding and management using agreed cost, schedule and performance baselines" has not yet been implemented.¹⁷

Defense Management Report (DMR). The Secretary of Defense provided an initial response to NSR-11 in June 1989. The DMR states that DoD must adopt certain management principles. Among these is stability in programs. "Reliable planning, funding, and system configuration, and continuity in management personnel, greatly increase the likelihood that systems will be delivered on time and at projected cost."¹⁸

Expert Opinions

I have cited the above studies to substantiate the assumption that weapon acquisition instability is a significant problem and that efforts to find solutions are well justified. The selected expert opinions which follow also validate this assumption.

David Packard, Former Deputy Secretary of Defense. Mr Packard recently identified five major deficiencies of the weapons acquisition process. The first three, which apply

directly to program stability, are "setting requirements", "underestimating schedules and costs" and "changes in programs and requirements, the turmoil in the system". Failure to properly set requirements and estimate cost and schedule are planning defects. "Turmoil" refers to constant changes or the inability to execute a plan in a disciplined manner.¹⁹

Dr. Robert B. Costello, former Under Secretary of Defense for Acquisition. Selected excerpts from a February 1989 article discussing the congressional role in acquisition expresses Dr. Costello's concern over the stability problem. "Over the last eight years, DOD has been forced to live with sawtooth funding, which plays havoc with rational planning." He notes the success story of multiyear procurement and its stabilizing effect on programs but goes on to say, "We need to give as much emphasis to funding stability, economic production rates and design stability as to savings in approving multiyear contracts." Dr. Costello echoes the claim that instability defeats effective planning and urges additional actions to stabilize programs.²⁰

Frank Carlucci, Former Defense Secretary. Perhaps the strongest critic of acquisition instability, Mr Carlucci has asserted, "We all know what is fundamentally wrong with (the acquisition system): Time and again instability has been scored as its most chronic defect." Concerned that the public has become distracted by alleged defense scandals, Mr Carlucci suggests that we "point out the inherent difficulties involved

in the instability of the process" and conceivably public
21
opinion will begin to focus on the true problem.

The Consequences of Instability

Thus far the thrust of Chapter II has been to validate the assumption that instability is a serious problem--and worth solving. In this final section, five major penalties resulting from weapon acquisition instability will be identified. The list is interrelated and, while not all inclusive, is reasonably complete.

Increased Acquisition Cost. Instability increases weapon system costs. Changing requirements, unachievable schedules and unanticipated budget fluctuations only add to program expenditures. The least costly approach is to properly plan a weapon acquisition and then execute it accordingly.

Additional Acquisition Time. Instability lengthens development schedules for the same reasons it increases costs. Whether the fault of planning or execution, a program which has become disconnected with its plan must be restructured. Usually some of the previously completed tasks need to be reaccomplished. As a minimum, overall efficiency suffers while a revised plan is developed and approved.

Business Strategies Lose Effectiveness. Business strategies lose meaning if the prospects for successful execution are low. AF competitive contracting is an example. Companies vie for programs; the AF strives to award to the

best firms, price and quality considered. Theoretically, the winners are committed to deliver in accordance with the negotiated terms. However, contractors with cost overruns or other problems often have opportunities to recover. Changing AF requirements and budgets frequently force contract renegotiations. During these renegotiations, it is often ambiguous whether the AF or the contractor is responsible for unfavorable performance. Some contractors intentionally underbid a program, counting on instabilities to renegotiate more favorable terms. This, of course, is commonly known as a "buy-in". In short, business strategies become ineffective when the PM cannot execute the plan.

Loss of Confidence. Instability causes a loss of confidence in the acquisition process, both in the minds of the participants and the public. Procurement plans and strategies are carefully prepared by the PM, reviewed by staffs and approved by senior DoD executives. When plans consistently fail to be fulfilled, the planning function loses meaning. When planned commitments are not enforced, discipline is lost. This breeds further instability and the perception that weapon programs are poorly managed.

Reduced Military Capability. This final and perhaps most significant penalty of instability is the reduction in military capability. False starts, restructured programs, unnecessary expenditures and lost time all have the effect of discounting the effectiveness of each dollar spent on AF

weapons programs. It is often suggested that the annual weapons budget could be cut by billions of dollars if strategies and associated funding were sufficiently stable to allow systematic and uninterrupted acquisition.

Summary

The first two chapters attempted to establish a framework for seeking solutions to the problem, "How can the PM improve weapon acquisition stability?" Instability reduces the effectiveness of the acquisition process, a fact documented in key studies and recognized by established experts. Some specific consequences of program instability are unfavorable impacts to program cost, development time, business strategies, public and employee confidence and military capability. There is little evidence to suggest a favorable trend towards more stability.

Notes

1. Edward Hirsch and Fred Waelchi, "Toward a Set of Guiding Principles for Defense Acquisition Management," Defense 89 (March/April 1989), p. 7.

2. John L. Frisbee, ed., Makers of the United States Air Force (Washington DC: U.S. Government Printing Office, 1987), p. 288.

3. Edmund Dews and Giles K. Smith, Acquisition Policy Effectiveness: Department of Defense Experience in the 1970s, (Santa Monica: Rand Corporation, Santa Monica, 1973) p. 71.

4. Ibid., p. 76.

5. William A. Long, "Final Report of the Task Force on Acquisition Improvement" (DoD Report, Office of the Under

Secretary of Defense, Research and Engineering, Washington D.C., 1981) p. 2.

6. Air Force Systems Command, "The Affordable Acquisition Approach, Executive Summary," Command sponsored study, Andrews AFB MD, 1983, pp. 1-3, 54, 83.

7. Ibid., p. 3.

8. Ibid., p. 124.

9. Successful Milestone I review is a prerequisite for entering the demonstration and validation phase of the acquisition cycle.

10. Major John L. Clay, USAF, "Cancellation of the Wasp System--Program Instability and Other Lessons," (Research Report, Air Command and Staff College, Maxwell AFB, AL, 1983), p. 38-40.

11. The President's Blue Ribbon Commission on Defense Management, A Report to the President on Defense Acquisition (Washington, D.C.: Government Printing Office, 1986), pp. 1,5 (hereafter cited as Blue Ribbon Commission, Defense Acquisition).

12. "The Affordable Acquisition Approach," p. 1.

13. Clay, "Wasp", p. 23.

14. Blue Ribbon Commission, Defense Acquisition, p. 12.

15. Ibid., p. 22.

16. "DoD streamlining urged in report," Air Force Times, 3 July 1989, p. 63.

17. "National Security Review (NSR-11) Summary", DoD White Paper, undated, p. 2.

18. Dick Cheney, "Defense Management Report to the President", (Department of Defense Report, July 1989), p. 10.

19. David Packard, "Micromanagement: The Fundamental Problem," Defense 88, (1988), p. 8.

20. Dr. Robert B. Costello, "Controlling the DOD Acquisition Process," Signal, (February 1989), p. 21.

21. Frank C. Carlucci, "Grappling With the Instabilities Of Our Acquisition System," Defense 88, (1988), p. 4-5.

CHAPTER III

THE CAUSES OF INSTABILITY

We all know what is fundamentally wrong with it: Time and again instability has been scored as its most chronic defect.

1
Frank Carlucci

Introduction

Assuming the previous discussions adequately described the nature and severity of the problem, the next step is to identify the causes of instability--that is, the "destabilizers". This chapter will do that. While addressing every source of instability is impractical, the most documented ones are included. In total, fourteen causes of instability will be discussed. No attempt will be made to segregate those destabilizers which the program manager might have the powers to avoid; the next chapter does that.

I have claimed that acquisition stability is a condition of quality planning and disciplined execution. This chapter continues that theme. To assist, a simple model is presented.

Instability Model

The model shown in Figure 3 is a means for organizing sources of instability and conceptualizing their effects. About 70 years ago, Henri Fayol identified five functions of management. While management theory has evolved significantly

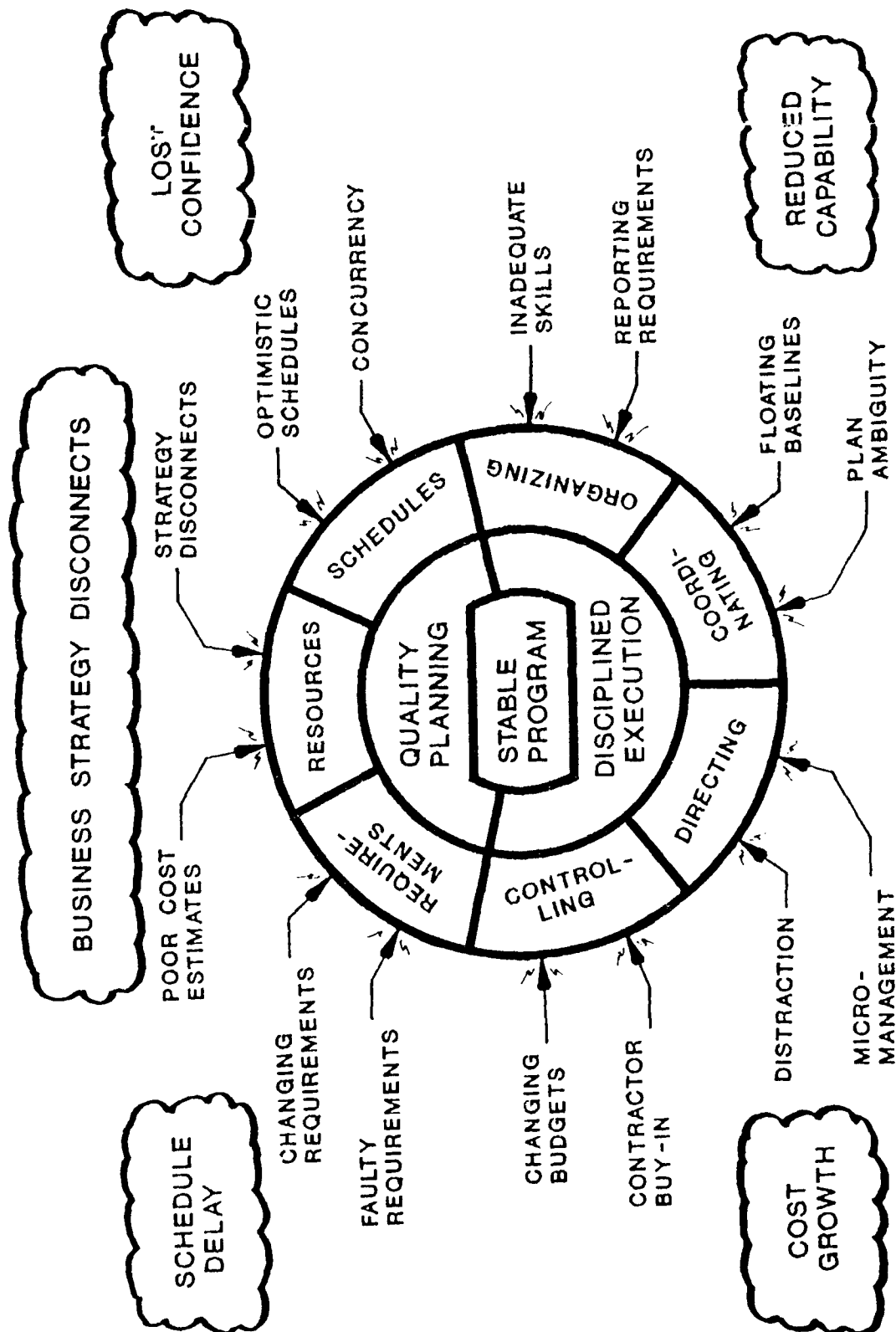


Figure 3: Instability Model. A stable program is "protected" by a quality plan and disciplined execution. However, 14 potential "threats" to stability are depicted, each one capable of introducing cost growth, schedule delay, business strategy disconnects, lost confidence and reduced military capability.

in the intervening period, the five are still relevant today and useful to the model. They are: planning, organizing, coordinating, directing and controlling. For these purposes, "planning" is subdivided into requirements, resources and schedules.² To elaborate, the plan details the approach for acquiring a weapon system with specified characteristics as defined by requirements; the plan also estimates the resource needs and predicts the schedule. Given the plan and the decision to proceed, the "execution" functions are organizing, coordinating, directing and controlling, all in accordance with the plan. Stated simply, executing the plan results in the product--the weapons system.

A stable program is "protected" by a quality plan and disciplined execution. However, fourteen destabilizers are potential "threats". Presumably, the PM has the power to counter many of them (the purpose of this study is, of course, to suggest which ones and how). Others may be beyond his or her control. Regardless, each destabilizer's potential impact is aimed against a planning function (requirements, resources or scheduling) or an execution function (organizing, coordinating, directing or controlling). If the destabilizers "penetrate", the program suffers when instability "leaks" in. As mentioned in chapter II, the impacts of instability are increased program cost, schedule delays, business strategy disconnects, lost confidence and reduced military capability.

The purpose of Chapter III therefore, is to describe the fourteen destabilizers depicted in the model. The set is presented as a reasonably comprehensive--but not an all³ inclusive--listing of the most common causes of instability. Selection was greatly influenced by the studies cited in chapter II.

Planning: Requirements Definition

Every weapon acquisition phase begins with expectations of achieving specified capabilities. These expectations are documented during the planning phase as "requirements". At a gross level of abstraction, military acquisition requirements must be guided by three factors: the nature of the threat, the ability to counter it and the willingness to expend the necessary resources. Programs which are disconnected with one or more of these imperatives can become unstable. Two possible mechanisms are faulty requirements and changing threats.

Faulty Requirements. The requirements planner has the difficult task of assessing threats, industry capability and resource availability over the life of the program. He or she must also factor in assumptions about national political consensus, economic condition and technology advancement. The acquisition of typical programs can take ten years or longer. The complexity of the process suggests a potential for less than perfect--or faulty--requirements.

For example, requirements are faulty if unrealistic. Some requirements have overestimated technical capabilities. They assume the availability of knowledge, materials or processes which are not likely to be available when needed. Some have referred to this as "built-in-failure". The AFSC Commander, General Bernard P. Randolph, has noted that the AF has sometimes been guilty of telling industry to achieve performance which is not possible. He further counsels⁴ planners ". . . to develop technical roadmaps--not miracles."

Second, requirements can be faulty because they overstate anticipated industrial capabilities. Political support is often influenced by "marketing" promises of significant capability enhancement. The tendency towards optimism is human and understandable. Intentional deception is unethical. The experienced acquisition manager often discounts early performance claims, recognizing that demonstrated capability generally falls short of prediction.

Third, the user may ask for more performance than needed, hedging against the possibility that the developer will fall short. For example, a mean-time-between-failure of 1,000 hours may be stated as a requirement, knowing that 800 or 900 hours is acceptable. Obviously, hedged requirements have the potential of adding unnecessarily to program cost. They also increase the development challenge and thus the risk of failure and instability.

Finally, requirements can be ambiguous. The user's documented operational requirements may not always adequately describe and communicate the desired capabilities. The program office can fail to understand the problem, threat or environment. The perceived urgency to initiate a program can distract both the user and the developer from the task of creating clear, concise descriptions of need up front.

The problem of faulty requirements, therefore, is a mismatch between what is stated and what is really needed or feasible. Either way, subsequent analysis, design or test will eventually reveal a program disconnect. The consequences will be instability resulting from the need for corrective action.

Changing Threats. A program can be destabilized because of changes in the nature of the threat.

Threats can grow. The intelligence community provides the user and the developer with estimated threat characteristics. Since program acquisitions take many years, estimates must consider current as well as future threats. AF anti-armor programs in the early 1980s, for example, struggled with unanticipated improvements in Soviet armor. The changing threat estimates in some cases impacted acquisition plans. Each time the threat grew, the effectiveness of each system had to be reevaluated and in some cases the revised threat caused the obsolescence of technical specifications, budgets and schedules.

Threat priorities can also change. At a macro level, strategic and conventional programs continuously compete for resources, with advocates in both camps. Changes in the world political environment shape the perceived threat. The potentially large reduction of Warsaw Pact and NATO forces, impossible to predict only a year ago, will have significant impact on threat priorities.

Concluding this discussion, instability can be caused by either faulty requirements or changing threats. In the case of the former, planning incorrectly states the requirements. The latter is a problem of potential plan obsolescence.

Planning: Resource Estimating

The second component of planning is resource estimating. Its purpose is to accurately identify and program the dollars, people, equipment and facilities needed to acquire the system. Two destabilizers which potentially threaten resource estimating are strategy disconnects and poor cost estimates.

Strategy disconnects. In theory, national objectives determine security policies which, in turn, dictate military strategies. Ideally, the executive and legislative branches agree on these strategies. On this basis, congress then funds military programs.

In practice, strategy disconnects between these two government branches are common. An example is the decade long debate over next generation intercontinental ballistic

missiles (ICBM) and their associated basing modes. Many members of the executive and legislative branches have studied and supported a number of missile configurations and basing schemes. However, only 50 MX missiles in fixed silos have been deployed to date. The fate of mobile basing and the Small ICBM remain uncertain. Similar debates are festering over virtually all future systems including fighters, armament, bombers, strategic airlift, and strategic defense.

President Reagan's Blue Ribbon Commission on Defense Management (see Chapter II) addressed the question of "national security planning and budgeting." David Packard, the chairman, summarized the findings as follows:

There is no rational system whereby the Executive Branch and Congress reached coherent and enduring agreement on national military strategy, the forces to carry it out and the funding that should be provided in light of the overall economy and the competing claims on national resources. The absence of such a system contributes substantially to the instability and uncertainty that plague the defense program.⁵

There is one success story. Multiyear contracting (MYC) is gaining acceptance as a method of connecting security planning and budgeting as discussed by the Commission. Under MYC, Congress commits to a production program at a specified funding level for up to five years. Unfortunately, few programs benefit from MYC.

Failure of the executive and legislative branches to agree on strategies and associated military programs detracts from effective weapon acquisition. The planner cannot predict

with confidence, which programs will be supported and funded in the future. The effectiveness of program planning is thus jeopardized by national strategic planning uncertainties and turmoil.

Poor cost estimates. Cost estimates are key elements of any acquisition plan. Program personnel spend considerable effort preparing them. Independent estimates are also required. Obtaining accurate projections can be difficult. Programs often involve new technologies and require years to complete. Yet, a poor cost estimate can render a plan unexecutable.

We read and hear less about cost overrun problems, both in the press and in the findings of major acquisition studies. This suggests that DoD has made improvements. The Blue Ribbon Commission also presented data suggesting declining cost growth in defense programs; further, defense programs experience relatively less cost growth than comparable "large, complex civil programs."⁶ Still, periodic examples of poor cost estimating demonstrate that the problem continues.⁷

Inaccurate estimates can result from the inability to predict technological advancements, task complexity, economic conditions, schedule requirements, support environments or system employment concepts. Additionally, as noted by the Blue Ribbon Commission, managers sometimes feel pressured to provide optimistic estimates, in order to obtain program go-ahead approval.⁸

Cost estimates provide the basis for programming budgets. They determine both the total funding required and the yearly phasing profile. Programs with faulty cost estimates eventually have to deal with the disconnects. A poor cost estimate is a destabilizer--a defect which will inhibit execution of the plan. When discovered, a revised plan based on the current cost estimate will be needed if the effort is to continue. The program will suffer the effects of instability.

Planning: Scheduling

Scheduling is the third element of the planning triad. Given requirements and resource estimates, the scheduler has the challenging task of time phasing activities. Two sources of instability will be discussed here: optimism and reliance on concurrency.

Optimistic schedules. Developing and acquiring a major AF weapon system in today's acquisition environment requires a decade or more of effort. Hundreds of discrete, interdependent tasks are involved. Estimating the length and logical sequence of each one is no easy job for those responsible for providing coherent, accurate schedules. The fact that schedule variances occur should not be surprising. However, these variances are almost always unfavorable--the actual schedule turns out to be longer than the prediction.⁹ Norman Augustine's XXII law is more true today than ever:

"Any task can be completed in one-third more time than¹⁰ currently estimated." Indeed, it may be part of the Air Force acquisition culture to habitually develop optimistic schedules.

Optimistic schedules are perpetuated for several reasons. First, planners can never foresee (and therefore do not include in their schedule estimates) all of the problems which must be overcome. Tasks generally appear easier during planning. In the course of execution, unanticipated friction is a common event (doubly common when software is involved).

Second, some managers believe the best way to minimize development time is to implement aggressive schedules. While recognizing the low probability of success, the work force is theoretically motivated to complete the activity in minimum time.

A third cause of schedule optimism is that AF and industry executives can feel pressured to adhere to unrealistic schedules for political reasons. Programs are more attractive with earlier fielding dates. Similarly,¹¹ schedules can be "milestone driven". Programs become locked into artificial calendar dates for major reviews or operational capability. Emphasis shifts from properly completing acquisition tasks to meeting these artificial milestones.

Schedules organize program activity and are therefore critical to stability. Accurate schedules facilitate

effective execution; optimistic ones create waste and raise questions about management competence.

Concurrency. Generally, acquisition "concurrency" means to proceed with the next acquisition phase before test and evaluation (T&E) from the previous phase is complete. Concurrent schedules can promote early weapon system fielding. However, there are associated risks: deficiencies affecting design may be discovered later in the acquisition cycle when they are more difficult to correct. Serious deficiencies can dictate redesign and retrofit of parts or subsystems.

Initiating production prior to completing full scale development T&E is a form of concurrency which received much attention in the 1980s. Congress exerted pressure on DoD to test and verify all operational effectiveness and suitability prior to spending production monies. They legislated a position in the defense department (the Director, Operational Test and Evaluation or "DOT&E") to oversee testing. DOT&E provides assessments of operational test results to the Secretary of Defense and Congress.¹² These reports have significant influence on whether programs receive initial production funding.

Of the three services, Air Force programs have historically included the most concurrency between full scale development and production.¹³ Proponents argue that the concurrent approach has fielded systems earlier; in general, risks were (and can be) managed. Further, eliminating

concurrency only adds to the already lengthy acquisition cycle. However, the opponents of concurrency in and out of Congress are currently more influential. The trend is away from concurrency. Congressional legislation and DoD policy now require that all critical effectiveness and suitability issues be resolved prior to production. Initial operational testing which emphasizes realism and objectivity is the mechanism to do this. In the future, the bias against concurrent production starts is likely to remain strong. The urgency to field weapons will be less than in the past, assuming the continuing perception of a diminished Soviet threat.

Not every acquisition expert supports the current T&E trends. Dr. Jacques Gansler notes that "It is time to return the focus of T&E from an 'auditing' function to the original objective of contributing to the timely delivery of high-quality, cost-effective weapon systems." He continues "The Congress, the Government Accounting Office, the media and other have been stressing, almost to exclusion, the quantity of testing done immediately before production. . . ."¹⁴

This study has no conclusions regarding the merits of current T&E trends except that the effect is to reduce the degree of schedule concurrency which will be permitted. Air Force programs which are not compliant with the rigorous test and evaluation policies will experience instability. This will occur where the PM fails to understand and accept the

policy implications. Affected programs will be planned with insufficient time for test preparation, conduct and reporting; or they will have too few test articles or too little test support programmed. In today's T&E environment, IOT&E often requires a year or more at the end of full scale development. The reporting phase alone, which can only begin after data collection is complete, requires over four months.¹⁵ To the extent planners do not properly account for current T&E policies, scheduling will be faulty and programs destabilized.

Execution: Organizing

Inadequate skills. The turbulent acquisition environment demands considerable expertise from AF program office personnel. State-of-the-art technology, sophisticated management systems and complex regulations are all occupational challenges. Successful execution of an acquisition plan depends on the competence of the acquisition team.

DoD has been criticized for a perceived less than adequate skill level among acquisition personnel. The Blue Ribbon Commission noted that this work force operates the largest procurement agency in the world, spending billions of dollars, yet "... compared to industry counterparts, (it) is undertrained, underpaid, and inexperienced."¹⁶ A former Air Force official notes that "The Defense Department will spend \$2 million to train a jet pilot and then put a poorly

trained young procurement officer in charge of buying hundreds of planes--matching negotiating wits with a sophisticated corporate vice president. . . ."

AFSC places significant emphasis on developing a quality acquisition force. The Command's new military and civilian accessions include some of the nation's brightest engineering and management college graduates. Throughout the 1980s, the quantity and quality of acquisition training programs have both increased. The Command has also instituted an acquisition certification program based on education, training and experience. Senior personnel assignments are tightly controlled by the AFSC Headquarters.

However, programs are heavily populated with junior personnel who interface directly with the contractor. Generally, most are serving in a program office for the first time. Company grade officers and junior civil service employees have significant responsibilities to execute major program tasks. To the extent that they lack sufficient experience and training to execute the plan, the program is destabilized.

Reporting Requirements. Tom Peters' first book, In Search of Excellence, recommends organizational structures be based on ". . . simple form and lean staff." The defense acquisition process has been criticized for violating this management precept. Critics suggest that decision making is not always responsive because of the long command channels.

Further, large headquarters staffs are accused of being populated by "suboptimizers"--functional experts who detract from the essential qualities of a program by overemphasizing their particular disciplines.

In 1986, the Blue Ribbon Commission suggested that weapon acquisition be managed with "limited reporting requirements" and "small, high quality staffs".¹⁹ The Commission specifically recommended the establishment of a new chain of command for major programs to include a DoD acquisition executive (DAE), individual service acquisition executives (SAE) and program executive officers (PEO).²⁰ DoD subsequently created these positions.

However, some critics claim that the Commission's intent was not fully implemented. While the DAE/SAE/PEO chain of command was created, ". . . the services' traditional buying commands . . . retained day-to-day oversight of programs."²¹ According to Jacques Gansler, a defense acquisition expert, "It doesn't logically follow then that you develop a parallel organization and have yet more people over a program manager."²² Walter Locke, a commission advisor, stated,

. . . if the program manager looks up the chain now, he still sees a bureaucratic morass, full of people who can say 'no' but not 'yes' and who can mess up a program without being held responsible.²³

Change is never easy for large bureaucracies. However, efforts persist to streamline the acquisition organization. The AFSC Commander, General Bernard P. Randolph, has curtailed HQ AFSC involvement in the direct management of program

execution. The AFSC Headquarters now concentrates on improving the process: organization, training, equipment and facilities.²⁴ General Randolph has divorced the Headquarters staff from direct program execution responsibility, instead recognizing it to be the responsibility of the PEO.²⁵ For those of us who have served in AFSC, this is a dramatic change. Defense Secretary Cheney has also initiated streamlining actions. His 1989 Defense Management Report promises to significantly trim away unnecessary bureaucracy and shorten ". . . the distance between top decision-makers and program managers."²⁶

A characteristic of stable programs is that efforts are channeled towards achieving the planned objectives. Reporting requirements must work to this end. The PM must have ready access to and receive timely decisions from senior executives. Staffs should facilitate the process. If claims are true that AF reporting requirements have deficiencies, then program stability is being adversely affected.

Execution: Coordinating

Floating Baselines. Acquisition stability exists when a quality plan is being followed. Actually no single "plan" defines an entire program; several are required. There are usually separate plans for management, system engineering, and test. However, more than any other, one plan is designed to promote stability: the program baseline. Baselines summarize

key performance, cost and schedule objectives and ensure coordination between affected organizations. Baselines are agreements between program offices and senior management. In effect, the former commits to achieving the specified objectives and the latter promises to provide specified resources (budget, manpower, facilities).

The AF has been refining the baseline process for several years. In the late 1970s, AFSC instituted a budget baseline. It tracked total estimated program cost, carefully accounting for every change. In the 1980s, baselines were expanded to include performance objectives and schedules.

The initiative was subsequently adopted by DoD. In 1986, it implemented baselining in Directive 5000.45, which states that a ". . . stable program environment provides the foundation for effective program management." ²⁷ Since then, many AF, Navy and Army programs have been baselined with OSD. The documents are now much shorter, usually less than ten pages, and contain only top level parameters.

Despite high expectations and a decade of effort, baselines have yet to create acquisition stability. Baseline commitments have not always been respected during the execution phase. Changing requirements and unfulfilled schedules too frequently invalidate the documents. For most programs, budget turbulence results in annual rebaselining. In short, baselines have not created the desired stability; rather than benchmarks, most float with time.

As mentioned in Chapter II, the Blue Ribbon Commission noted this problem. So did several senior DoD managers who recently met at the Defense Systems Management College:

The dilemma for the acquisition authority is that most "baselines" in existence are rapidly outdated and are not used as control mechanisms, but instead as a paper exercise to fulfill reporting requirements. The preparer knows the limit of their value, and an educated reader generally discounts the information presented.²⁸

The AFSC Commander, General Bernard P. Randolph, recognizes that the baseline is not yet a panacea for instability: "We are not going to see overnight success in terms of trouble-free programs. Too many external factors bear on the acquisition cycle." However, he goes on to say, "The baseline is a solid management tool that limits instability and outlines the program director's authority to do the job."²⁹

Plan Ambiguity. If outdated or non-existence baselines fail to coordinate the plan with senior management, plan ambiguity limits the coordination among the program team. For the purposes of this discussion, the program team consists of those personnel in the AF and contractor program offices as well as representatives in other commands and agencies who directly support the acquisition of a system.

Weapon system acquisition is a difficult undertaking involving many people, organizations, technologies, interfaces and other execution complexities. It is not enough to have a valid plan. The plan must be understood by members of the

program team. I am convinced that this is often not the case. Too many team members have insufficient knowledge of objectives, key operating and engineering parameters, approved resources, subsystem interfaces, support requirements, and major milestone commitments. Further, they may not recognize the consequences of deviating these planning elements.

When team members misunderstand the plan, effort is wasted. Personnel are caught by surprise or unprepared. Participation in meetings is less productive. Otherwise, avoidable mistakes are made. Disconnects fester among team members due to incompatible ideas of objectives, milestones and resources. Tasks perceived to be low priority by some can hold up the high priority tasks of others. In short, efforts are not coordinated.

"Supervision is not the art of directing but rather of explaining." This axiom is echoed by leadership and management experts. Perry M. Smith wrote in Taking Charge, "Teachership and leadership go hand-in-glove. In order to be a good teacher, a leader has to be a good communicator, must be well organized and a goal-setter." Tom Peters, author of best selling management books states, "The trick is demonstrating to people, every day, where you want to take your organization. It's being amazingly consistent that counts, ignoring the charge (which will be leveled) that you are a broken record."

Acquisition managers should act like broken records when explaining the plan of execution. Too often they are not. Military personnel are conditioned to giving and taking orders rather than explanations. Educating the program team takes time. An easier but less effective alternative is self education--such as reading lengthy program files. Worse, the acquisition plan might not exist in an integrated, simplified form suggesting that few really understand it. Finally, and most disturbing, some managers believe that sharing information is not always advantageous. Again quoting Mr Peters,

Information hoarding, especially by politically motivated, power-seeking staffs, has been commonplace throughout American industry. . . . It will be an impossible millstone around the neck of tomorrow's organization. Sharing is a must.³²

Plan ambiguity and floating baselines are two impediments to execution. A good baseline provides the coordination with senior management. Plan clarity promotes program team coordination. When these do not exist, execution suffers and with it program stability.

Execution: Directing

Directing is a key day-to-day function of management. Activities are guided and orchestrated to achieve planned objectives. The manager initiates and terminates tasks; updates priorities; resolves problems; and adjusts resources as necessary. Directing large programs is analogous to Teddy

Roosevelt's "big ship with a little rudder". Acting is far superior to reacting. Management theory teaches that direction should be issued at the lowest possible level; those closest to activities are generally in the best position to manage them. However, two related problems have been identified which reduce the acquisition manager's freedom to effectively direct programs: micromanagement and distraction.

Micromanagement. In simple terms, micromanagement occurs when higher levels of bureaucracy over manage. Congress, the Pentagon and service material commands have all been accused of usurping functions better performed by lower level managers. William H. Gregory, former editor of Aviation Week and Space Technology and author of The Defense Procurement Mess³³ has written extensively about micromanagement. He argues that Congress is involved in the "nitty gritty" of defense acquisition. Further, "... government policymakers get caught up in the shobboleths of reform: commonality, prototyping, competition, (and) clever but complex contracting methods." Quick fixes to perceived problems are solved with an ever increasing number of regulations constraining management flexibility and prerogative, according to Gregory. "Attention to paperwork procedures and fine print has tended to supersede concern over the technical and performance objectives of weapons under development." Regulations accumulate over time and "massive paperwork requirements" are created. Air Force magazine estimates that

the acquisition process is "governed" by 4,000 laws and 30,000
34
pages of regulations.

Distraction. Once a weapon acquisition is initiated, the PM should be concentrating on executing the approved plan. However, he or she is often distracted. One reason is the need to ensure compliance with the myriad of regulations and reports mentioned in the paragraph above. Another is responding to audits which, in recent years, have become more and more frequent. One major program averaged ten audits or
35
inspections per year over the last eight years. Time otherwise spent managing must be allocated to answering questions and responding to findings.

PMs are also distracted from their primary responsibilities by the need to provide briefings. All programs regularly give status presentations up the chain of command and to concerned organizations and staffs. Coordination for a major program milestones (for example, a production approval decision) can require dozens of presentations. The Blue Ribbon Commission noted that the PM frequently must sell the system and defend against budget cuts. "The program manager spends a very high percentage of his time briefing his program, writing reports on his program, and defending his program, thus doing everything except
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managing his program."

The Defense System Management College has noted that "program managers literally designate themselves as 'Mr.

Outside' and designate their deputies as 'Mr. Inside'. In the bureaucratic world of major systems acquisition, with so many people in a position to provide direction and control, conflicting and contradicting direction is an ever-present danger.³⁷ In a sense, being "Mr. Outside" relegates the PM to the role of a reporter and coordinator rather than a traditional manager.

"Micromanagement" and "distraction" affect stability to the extent that they are real problems. Many experts believe the problem is severe. Stability requires execution according to the approved plan. The PM and acquisition team are responsible for directing a complex activity. Cookbook solutions do not exist. The job is full time. When upper levels of the bureaucracy become involved in the details of a program, or distract those with direct management responsibility, execution suffers.

Execution: Controlling

This final subgroup consists of two destabilizers: contractor buy-in and budget instability. These are classified as problems of execution control because they both create deviations from the plan. In the case of the former, the contractor does not perform as planned; and the latter, planned funding is not provided.

Contractor Buy-in. Most acquisition managers have experienced buy-ins at one time or another; AF competitive

source selections often evaluate proposals with buy-in promises. In fact, some industry personnel argue that buy-ins are occasionally a legitimate strategy for acquiring and maintaining business, perhaps even a necessity.

For the purpose of this study, a "buy-in" will be broadly defined to include both "optimistic proposals" (the traditional definition) and "trust me tactics". "Optimistic proposals" offer performance levels, cost goals or schedules which are not likely to be achieved, with the motive of winning competitive programs. "Trust me tactics" are employed during program execution. The contractor optimistically projects final system performance levels in order to placate the program office early on. As time passes, the degraded performance gradually becomes apparent. The AF is left with a take it or leave it dilemma: accept the item as is or initiate a redesign with significant cost and schedule impact.

Optimistic proposals and trust me tactics inevitably result in cost, schedule and/or performance variance. Even so, these buy-ins can still be profitable if either of two events occurs: the AF awards follow on business; or it subsequently renegotiates the contract.

The process of recovering buy-in losses through follow on business is easily understood. However, why should the AF renegotiate a contract? From my experience, the service too often initiates changes on its own, for example to revise

performance requirements, impose a new budget profile or
38
change quantity. In the process of renegotiating, impacts
due to a buy-in are often difficult to distinguish from
impacts due to AF initiated changes. Combining this with the
sole source environment in which these changes typically
occur, and a sense of urgency by the AF to complete
negotiations, the environment is ripe for the contractor to
recover the buy-in losses. One industry manager told me that
government initiated contract changes have been quipped the
"golden rope" to profitability.

While one might blame industry for the problem, the real
culprit is the acquisition process. As discussed earlier in
this chapter, AF acquisition plans can include unrealistic
performance requirements or unachievable cost goals. When
competition is intense and contracts awarded largely on the
basis of price, the system unintentionally encourages buy-ins.
And again, the propensity of the AF to frequently change the
contract enhances industry prospects for recovering from buy-
ins. To illustrate the point, consider the dilemma of a
contractor who is preparing a proposal. If the proposal is
realistic, the program could be lost to a competitor with a
buy-in strategy. In all likelihood, this competitor would
recover its losses over time. A hard choice.

The Blue Ribbon Commission noted this deficiency while
describing "problems with the present defense acquisition
system":

The preparation of competitive proposals may very well expose technical problems with the specifications, or reveal modifications that would be cost effective. The environment in which program competition typically takes place, however, encourages improvements within specifications, but discourages modifications that deviate from specifications. This effectively forecloses one principal factor--trade-offs between performance and cost--on which the competition should be based. The resulting competition, based instead principally on cost, all too often goes to the contractor whose bid is the most optimistic.

In underbidding, contractors assume there will be an opportunity later in a program to negotiate performance trade-offs that make a low bid achievable, or to recover understated costs through engineering change orders . . .

The DoD program manager sets out to accomplish the improbable task of managing his overspecified and underfunded program to a successful conclusion.³⁹

This discussion was not intended to suggest that all contractors and their personnel engage in buy-ins. On the contrary, most commit to contractual performance levels in good faith and endeavor to provide objective estimates. However, buy-ins continue to be a problem affecting acquisition stability.

Changing Budgets. Of all the sources of instability, this is the most documented and perhaps most problematic. Budget instability is similar to the "strategy disconnect" discussed earlier under planning; however this destabilizer occurs during execution. Budget instability is defined as the inability to control deviations from planned budgets.

Each time a program meets a milestone decision point,⁴⁰ funding profiles are reviewed. If a program is approved to proceed into the next phase of acquisition, the commitment is

implicit that planned funding will be provided. However, all too often this does not occur--actual funding profiles can differ significantly. This suggests poor linkage between the program approval and budget processes. Every two years the defense department updates budget priorities; for congress, this occurs annually. Funding authorizations frequently change. Congress makes thousands of small cuts in a typical year impacting almost every program.⁴¹ Acquisition expert Jacques Gansler notes that the problem is not limited to Congress. "But DoD itself must also achieve stability. Congress annually changes 50% of the line items, but DoD annually changes 100%."⁴² In its report to the 101st Congress, the Air Force stated,

The entire defense establishment has experienced a budgetary roller coaster. In the 10 to 15 years it takes to develop and field a new weapon system, there may be several substantial swings in defense funding. The inefficiency associated with this lack of stable financial planning dwarfs all other causes of inefficiency in defense procurement and programming.⁴³

Inefficiencies from budget instability are manifested in several ways. Perhaps the most common is program stretchout. When budget difficulties arise, the tendency is to extend (reduce current year funding across the board and thereby stretch the schedules) rather than cancel programs. Extending schedules usually adds to total program cost because fixed overhead expenses are incurred over a longer period. Quantities are also smaller and less economical. According to James Kitfield, senior editor of Military Forum, "The services

buy fewer, ever more expensive weapons; then the inefficiencies of program stretchouts make them even more expensive, and the services can afford to buy fewer of them still."⁴⁴

Another consequence of defense budgeting practices is that most programs learn of yearly funding levels very late. The current fiscal year, FY 1990, is an example. The executive branch delayed submitting its final FY 1990 defense priorities due to the change of administration.⁴⁵ Congress took many exceptions and failed to pass an appropriations bill prior to the fiscal year start. Well into FY 1990, the allocation of billions of dollars for a number of defense programs had yet to be decided. Impacted programs included the Strategic Defense Initiative, Peacekeeper, Small Intercontinental Ballistic Missile, the F-14, B-2 and V-22 aircraft and many smaller efforts. The monies involved were planned for obligation during FY 1990 (1 October 1989 through 30 September 1990) yet the appropriations bill was not passed until late November.

How can programs be effectively executed under these circumstances? No private company could profitably operate this way. According to the Blue Ribbon Commission, successful commercial programs enjoy dependable resource commitments from upper management.⁴⁶ Contrast this with the turbulent status of the FY 1990 defense appropriation, two weeks after the start of the fiscal year:

Conferees have to decide if they are going to overrule Secretary of Defense Richard B. Cheney and fund the Navy's F-14D and Marine Corps V-22 transport. Many believe the money for funding these programs will come from the Air Force's B-2 program.

Another staff member said the conference's panel on terminated programs such as the F-14 and V-22 met for the first time Oct. 3. In this "opening shot," the issues were put on the table, but by Oct. 6 there had been no negotiations.

Casting a shadow over all the negotiations is an unknown, however: Conferees have to shake \$1.3 billion from the defense budget for the drug war.

"Where will that come from?" asked a Senate staff member. "There is some sentiment for letting the Department of Defense decide" where to make the cuts.⁴⁷

Summarizing this section, changing budgets are the result of debates over priorities in the executive and legislative branches. When budget cuts are necessary, programs are often stretched rather than canceled. Fiscal year funding amounts are often not known until after the start of the fiscal year, creating near term execution uncertainties. The result is program instability.

Summary

This chapter proposed a model to organize and conceptualize weapon acquisition instability. Fourteen destabilizers were identified and discussed. A summary is provided in the appendix (page 90). The list is reasonably comprehensive--but not all inclusive--of the most common causes of instability. The next chapter will recommend actions, within the authority of the PM, to minimize or avoid the effects of these destabilizers.

Notes

1. Frank Carlucci, "Grappling With the Instabilities of Our Acquisition System," Defense 88, (1988), p. 4.

2. For simplicity sake, additional planning elements have not been specified. However, most can be conceptually included under requirements--for example, logistical, regulatory and business strategy "requirements."

3. The claim that fourteen constitute a reasonably comprehensive list of destabilizers is supported the the AFSC "A3" Study. It identified factors which contribute to cost and schedule growth. These factors correlate well with the fourteen destabilizers. See Air Force Systems Command, "The Affordable Acquisition Approach Study, Executive Summary," Command sponsored study, Andrews AFB MD, 1983, pp. 60, 65.

4. John T. Correll, ed., "Back Through the Ringer, " Air Force Magazine, (April 1989), p. 39; and General Bernard P. Randolph, USAF, "State of Air Force Acquisition," speech delivered to the Defense Systems Management College, Ft Belvoir, VA, 2 May 89.

5. David Packard, "Micromanagement: The Fundamental Problem," Defense 88, (1988), p. 8.

6. The President's Blue Ribbon Commission on Defense Management, A Report to the President on Defense Acquisition (Washington, DC: Government Printing Office, 1986), p. 37 (hereafter cited as Blue Ribbon Commission, Defense Acquisition).

7. For example, the Advanced Medium Range Air-To-Air Missile was reported to have suffered from serious underestimating. See "The Pentagon's Misguided Missile," U.S. News and World Report, (May 1, 1989), p. 33.

8. U.S. Senate, Committee on Armed Services, The Acquisition Findings in the Report of the President's Blue Ribbon Commission on Defense Management (Washington, D.C.: Government Printing Office, April 4, 1986), p. 34 (hereafter cited as U.S. Senate, Blue Ribbon Commission Findings).

9. The experienced acquisition professional will not refute the claim that schedule estimates almost always err on the side of optimism. For an excellent discussion of the problem, see James Kitfield, "Unguided Missiles?" Military Forum (April 1988), pp. 16-24.

10. Norman R. Augustine, Augustine's Laws (New York: Viking Penguin Inc., 1986), p. 152.
11. Again, for a discussion of milestone driven schedules, see Kitfield, "Unguided Missiles?"
12. DODD 5000.3 provides policy for test and evaluation. Paragraph D.1. specifies DOT&E responsibilities.
13. Peter Grier, "Which Service Buys Best?" Military Forum, (March 1989), p. 38.
14. Dr. Jacques S. Gansler, "Needed Changes in Weapons Testing," Program Manager, (September-October 1989), p. 14.
15. Defense Systems Management College, "Pre/Post Production T&E," Course material TE635, Program Managers Course, Ft Belvoir, VA, 1989, p. 1.
16. Blue Ribbon Commission, Defense Acquisition, p. 28.
17. Stanley A. Weiss, "Change the Pentagon's Shopping Habits," Across the Board, (December 1988), p. 53.
18. Thomas J. Peters and Robert H. Waterman, Jr., In Search of Excellence (New York: Warner Books, 1983), p. 311.
19. Blue Ribbon Commission, Defense Acquisition, p. 12.
20. Ibid., p. 17.
21. James Kitfield, "Reforms: Running in Place," Military Forum, (March 1989), p. 43.
22. Ibid.
23. Ibid.
24. General Bernard P. Randolph, "State of Air Force Acquisition," Presentation to Defense Systems Management College, Ft Belvoir, Virginia, 2 May 89, p. 3.
25. Ibid., p. 13.
26. Myron Struck, "DoD Streamlining Urged in Report," Air Force Times, (3 July 1989), p. 69.
27. Department of Defense, "Baselining of Selected Major Systems, Directive 5000.45," (Washington, DC: Government Printing Office, August 25, 1986), p. 1.

28. "DoD's Top Acquisition Managers Analyze Where the System Stands," Defense 88, (1988), p. 26.

29. General Bernard P. Randolph, USAF, "Air Force Acquisition: Toward the Direct Route," Program Manager, (September-October 1988), p. 6.

30. Perry M. Smith, Taking Charge (Washington, DC: National Defense University Press, 1988), p. 4.

31. Tom Peters and Nancy Austin, A Passion For Excellence (New York: Random House, 1985), pp. 324-325.

32. Tom Peters, Thriving on Chaos (New York: Harper and Row, 1987), p. 610.

33. William H. Gregory, The Defense Procurement Mess (Lexington Mass: D.C. Heath and Company, 1989), pp. 1, 3, 4.

34. John T. Coriell, "Son of Packard," Air Force Magazine, (September 1989), p. 4.

35. David Fulghum, "The weapons pushers," Air Force Times, (August 7, 1989), p. 14.

36. U.S. Senate, Blue Ribbon Commission Findings, p. 34.

37. Defense Systems Management College, "The Program Manager's Notebook," Student course material, Program Managers Course, Ft Belvoir, VA, November 1988, p. 1.2d.

38. Note that this is a case of instability in one area creating instability in another, e.g., requirements instability rears contract instability.

39. Blue Ribbon Commission, Defense Acquisition, pp. 6-7.

40. Milestones are formal program decision points. Milestones I, II and III proceed concept definition/validation, full scale development and production, respectively.

41. Frederick H. Hartmann and Robert L. Wendzel, Defending America's Security (Washington: International Defense Publishers, Inc., 1988), p. 161. Data was from fiscal years 1982-1985.

42. Dr. Jacques Gansler, "The changing Defense Acquisition Environment," Key Speeches, (July 1988), p. 3.

43. Department of the Air Force, "Report to the 101st Congress, Fiscal Year 1990," (Washington DC: Government Printing Office, 1989), p. 52.

44. James Kitfield, "Acquisition: Are Stretchouts the Answer?" Military Forum, (January/February 1989), p. 22.

45. On March 25, 1989, the Bush administration revised the FY91 President's Budget which was originally submitted on January 9, 1989.

46. Blue Ribbon Commission, Defense Acquisition, p. 12.

47. David Fulghum, "Funding for Key Weapons Still Not Set," Air Force Times, (October 16, 1989), p. 69.

CHAPTER IV

RECOMMENDATIONS

. . . we must also take necessary steps to ensure the stability of individual programs. Program stability contributes to reducing total program costs while facilitating long-range planning. The major factors of program stability are: firm development schedules, set specifications, consistent funding, and steady production rates.

¹
"The FY 1990 Defense Budget"

Introduction

Although few predicted it, the late 1980s witnessed glasnost, perestroika and the emergence of non-communist governments in Eastern Europe. American industry is returning to an emphasis on quality, having learned hard lessons from the Japanese management model.² Perhaps the time has come for substantial, positive changes in AF acquisition stability, encouraged and assisted by program managers (PM).

As Chapter I stated, the purpose of this study is to propose actions which the PM can implement to improve weapon acquisition stability. The pages which follow contain five specific recommendations. The previous chapter identified fourteen destabilizers, summarized in the appendix (page 90). The recommendations are targeted at these destabilizers.

To illustrate relationships, Figure 4 shows a matrix of destabilizers and recommendations. Each "x" denotes a

<u>Destabilizers</u>	<u>Recommendations</u>					
	<u>Quality requirements</u>	<u>Realistic estimates</u>	<u>Plan education</u>	<u>TQM</u>	<u>Contractor commitment</u>	
Faulty requirements	x	x	x	x		
Changing threats						
Strategy disconnects						
Poor cost estimates	x	x		x	x	
Optimistic schedules	x	x		x	x	
Concurrency		x		x		
Inadequate skills			x	x		
Reporting requirements						
Floating baselines						
Plan ambiguity			x	x		
Micromanagement						
Distraction						
Contractor buy-in				x	x	
Changing budgets						

Figure 4: Destabilizer/Recommendation Matrix. Each "x" correlates a recommendation and a destabilizer. The recommendations affect 7 of the 14 destabilizers.

correlation--where a recommendation has an antidotal effect on a destabilizer. Note that seven of the destabilizers are unaffected by the recommendations. Specifically, these are changing threats, strategy disconnects, reporting requirements, floating baselines, micromanagement, distraction and changing budgets. The PM is not in a position to effectively influence these destabilizers. Their causes are beyond the PM's control--the result of forces external to the program office. Chapter V, the summary, will discuss the implications (see Epilogue).

This chapter includes few revolutionary ideas. Experienced acquisition personnel will already be familiar with most of the recommendations; some have been advocated for years. Admittedly, they are greatly influenced by previous weapon acquisition studies, contemporary management theory, and the DoD total quality management (TQM) program. But while solutions may be known, they are not always implemented. Fundamental changes to the acquisition process and culture are required. Again, as concluded in Chapter II, acquisition instability problems continue to be documented. The associated costs are not always fully appreciated.

Recommendations

Recommendation 1. Quality Requirements. The PM should pursue early requirements definitization and validation; and consult often with the user on this subject.

Requirements are the foundation of an acquisition program. Stable programs need quality requirements--that is, accurate descriptions of the characteristics needed to counter the target threat. Quality requirements are clear, concise and deconflicted; complete; within the reasonable grasp of technology; and provided in time to support an efficient acquisition program. The user is the source of operational requirements. The developer provides cost and schedule estimates, supports operational effectiveness analysis and trade off decisions, and translates the user's requirements into technical specifications.

The PM can help create quality requirements by adhering to proven system engineering practices.³ In the infant stages of a new acquisition, the user provides only essential top level system requirements. As the development proceeds and the design matures, both the user and developer actively definitize the detailed requirements. Design tradeoffs are finalized. The system is gradually defined. Concepts for operation and support take shape. The end item product becomes fully specified. Support documentation is validated and verified. Risks are managed. During the entire process, dialogue with the user is continuous, frank and timely.

Difficult requirement issues can create a dilemma for the program manager. Critical support, especially funding, can be negatively influenced by perceived program problems or unknowns. The PM might be tempted to defer tough issues,

understate technical challenges or accept unreasonable risk. However, deferring requirement disconnects is a short term strategy. The imperative, from a stability standpoint, is to pursue early requirement resolution.

To promote early requirement resolution, the PM should avoid becoming the program advocate. The user must assume that role. Otherwise, the PM has conflicting interests--between identifying potential system disconnects and promoting the program. He or she cannot be the honest broker who ensures⁴ objective and timely resolution of requirement issues.

The PM should likewise focus the program team on user satisfaction. The program team is a supplier and a user is a customer. One of the significant management lessons of the 1980s is that successful suppliers have customer⁵ orientations. The AFSC TQM program includes, as a primary⁶ precept, satisfying the user needs. Further, "Goal Number⁷ One" is to "Meet (the) users' needs--with value". Program teams must create an environment which facilitates timely definition, evaluation and resolution of requirement disconnects. Trust and rapport are key. This enhances stability.

A major challenge for the PM is to translate the user's operating requirements into contractual or engineering specifications. A common criticism of the acquisition process is that specifications include unnecessary requirements. In short, they are not tailored. Again, a prerequisite for

avoiding this problem is a focus on the user's need and environment. In this way, requirements can be properly prioritized, eliminating those found to be of marginal use in satisfying the user's need.

The PM has an obligation to validate concepts and designs early. Early validation ensures that solutions to the user's requirements are achievable. Again, proven system engineering practice, if followed, provides the framework. Using a systematic process, requirements are thoroughly reviewed and scrubbed before being allocated to system components and incorporated into the product design. Formal reviews, attended by independent technical experts and user representatives, can be very effective if properly timed and focused on the technical aspects.⁸ Until the requirements are known, the PM must avoid committing to a design--in essence⁹ providing the answer ahead of the question.

Continuing this theme, engineering solutions to user requirements should be demonstrated early. At each stage of design maturity, rigorous testing is the proper means for verifying readiness to continue with development. Prototyping of both hardware and software is increasingly a recommended approach.¹⁰ The use of preplanned product improvement (P3I)¹¹ is likewise gaining acceptance as a way to pace solutions.

Finally, the user needs accurate cost and schedule information to make the best trade off decisions. Initially, these trade offs are between alternative programs; later the

user must decide between various design options and eventually on equipment allocations and facility locations. The process is like a chicken and an egg: the user establishes requirements based on estimates--but the estimates are derived from requirements. Harmonizing requirements and estimates is possible, however, by creating an iterative, closed loop issue resolution process with the user. This requires open and frequent communications and a user orientation.

In summary, the PM will improve program stability by placing a high value on quality requirements. This can be achieved by following proven system engineering practices; promoting early requirements definition; avoiding an advocacy role; focusing on the user's needs; validating solutions early; and establishing a closed loop issue resolution process.

Recommendation 2. Realistic Estimates. The PM should create realistic cost and schedule estimates.

Recommendation 2 appears to promote the obvious. Clearly, good estimates are by definition realistic--that is, reasonably achievable. Why then, this recommendation? The answer is that AF acquisition managers have a bias towards optimism. As discussed in chapter III, this is often because programs become more desirable as their associated costs and schedules shrink. Managers have the perception that optimistic estimates enhance program support. Some estimates are in reality predetermined by top-down direction. Moreover,

managers may feel vulnerable to criticism if they do not support or develop aggressive, success oriented estimates. In short, optimistic cost and schedule estimates tend to be culturally accepted--part of program management.

However, optimistic estimates are not compatible with stability. If the management doctrine teaches quality planning and disciplined execution, then estimates should reflect objective cost and schedule predictions. Plans with realistic estimates will have the best chances for stability.

Here again, the PM can be faced with a dilemma. A realistic estimate will enhance the prospects for long term stability; however, it will also advertise a higher cost and a longer schedule, potentially eroding support. A competitor program with an optimistic cost and schedule may become the preferred choice even though in reality its marginal contribution to defense--cost and performance considered--is less. If stability is the higher imperative, the PM should opt for realism.

As discussed in Chapter III, evidence suggests that cost estimates are becoming more realistic. PMs can continue this trend in several ways. One is to insist on budgets which include funding for uncertainty and risk. Another is by promoting the development of quality requirements (see Recommendation 1) which in turn facilitates accurate task definition. The PM should also ensure that budgets account for the costs of all system elements, not just end item

weapons. Included are: test assets, test support and unique test facilities; logistics documentation, spares and facilities; training materials, equipment and facilities; and system installation, checkout and start up expenses.

Turning to schedules, major procurement studies have shown a trend towards longer acquisition times.¹² The growing sophistication of weapon technology is partly to blame. Test and evaluation (T&E) is also a factor. As mentioned in Chapter III (see "concurrency"), programs are now required to schedule more extensive testing, particularly initial operational test and evaluation (IOT&E). IOT&E must be completed,¹³ assessed and reported prior to the start of production. Other documented causes of longer acquisition schedules include increasingly complex procurement rules and underfunding.¹⁴ A diminishing Soviet threat and a shrinking defense budget suggest even less pressure to accelerate weapons procurement in the coming years.

The PM cannot change this environment. The reality, at least in the near term, is that external factors will aggravate acquisition schedules. Concept demonstration/ validation programs will be expected to provide high confidence that systems are feasible and affordable--dictating longer schedules. Full scale developments will require five to six years rather than the three to four years which have typically been scheduled (but not achieved) in the past. Production

rates will continue to be modest at best. Only fundamental changes in the acquisition environment will cause a change.

In summary, to promote stability, the PM should avoid cost and schedule estimates which are biased with optimism. Budgets should include all system costs; and schedules reflect the realities of the current acquisition environment. The following quote from the chapter titled, "Set Conservative Goals", in Thriving on Chaos by Tom Peters is a fitting conclusion for the second recommendation. While the subject is "budget drills," the observation is equally valid for "schedule drills."

In too many firms, budget drills, though nominally bottom-up, are in fact top-down. Targets are sent down, and you sign up--or else. So you do sign up, and some succeed. Many more fall short, and given the generally unrealistic nature of the estimates, you can't punish those who fail (that is, you can't punish 70 percent of all managers). More important, no one at any level can depend upon anyone else; the "numbers" are jokes. And when "numbers discipline" goes, so does the rest of the discipline.¹⁵

Recommendation 3. Plan Education. The PM should continuously educate the team members on the contents of the plan. Moreover, an informal baseline should be developed for this purpose.

To review, "team members" are defined as those personnel in the AF and contractor program offices as well as representatives in other commands and agencies who directly support the acquisition of a system. The "plan" is not actually contained in a single all inclusive document, but

rather in a series of documents such as the decision coordinating paper, formal baseline, program management plan, and the test and evaluation master plan.

Chapter III discussed the problems of "inadequate skills" and "plan ambiguity." Team members often have limited acquisition experience. Further, many also have too narrow an understanding of the plan. They learn its contents by reviewing planning documents contained in the program files or by attending technical interchanges, staff meetings and other reviews. The PM and other program office supervisors are very busy. Consequently, first line specialists and managers receive guidance and direction only related to specific areas and near term activities. The using and supporting command representatives likewise monitor the program primarily by reading documentation and attending status reviews and technical exchanges. In short, the program team's effectiveness can be limited.

The solution is for the PM to continuously educate the program team on the contents of the plan. The methods should match the PM's management style (although a specific technique is suggested in the next paragraph). However, the education process should have five characteristics. First, communications should be in simple terms, comprehensible by all team members. Second, it should be repetitive and top level--avoiding detail. Third, the PM should be able to easily and quickly update the contents. Fourth, the education

technique should provoke interest and enthusiasm. Finally, it should, as a minimum, describe the system mission, the operation and support objectives, resource goals and constraints, milestone commitments, and team member roles and responsibilities.

I am convinced that one specific technique can be very effective. The PM should create an "informal baseline" in the form of a nominal one hour presentation. The emphasis should not be on current program status or recent accomplishments; neither should it be an advocacy presentation. Rather the briefing should present a top level integration of all planning entities and provide a vision of how the program will be executed. Each of the characteristics mentioned in the previous paragraph should be included in this informal baseline. The remainder of this discussion will substantiate its potential value.

The informal baseline is uniquely tailored for educating the program team about the contents of the plan. Other existing plans are written for different audiences and purposes--typically to obtain staff coordination. For example, the decision coordinating paper facilitates milestone approval. The acquisition plan satisfies the procurement review and approval process. The formal baseline is a management contract between the PM and senior DoD acquisition officials. Other plans focus on functional areas and define program details. Examples are the systems engineering

management plan, the integrated logistics support plan, and the test and evaluation master plan. The only generalized planning document is the program management plan (PMP). However, the PMP requires extensive coordination, exists in long, written format and the contents are specified by regulation. In creating the informal baseline, the PM can choose the form which will best educate the program team on the overall plan and execution vision.

The informal baseline has several desirable characteristics. As mentioned, no regulation prescribes the form or coordination requirements. The PM has the flexibility to continuously refine the informal baseline as long as it complies with program direction and prior commitments. The informal baseline integrates the critical points of all other plans. It creates a conceptual hierarchy which education experts claim to be essential for effective understanding. The one hour format keeps the informal baseline top level. It can be conveniently presented at program meetings attended by AF and contractor program office personnel and the representatives from participating commands and agencies. The informal baseline is also excellent for briefing newly assigned members of the program office. In short, it is an effective means of continuously educating the program team on the contents of the plan.

The informal baseline also has valuable by-products. It aids the PM in thinking through the execution of the plan.

Disconnects can be discovered earlier and resolved with less impact. The informal baseline also provides the opportunity for team members, especially representatives of the using and supporting commands, to give feedback and raise issues. This user input is especially useful for refining program requirements. The informal baseline also creates an open atmosphere, demonstrating that the PM is willing to share information. Finally, the PM can encourage other team members to become proficient at presenting it. An ideal situation would be one in which all experienced team members are able to brief the informal baseline.

The best managers do not direct--they explain. The PM has much to explain in the course of leading the program team to acquire a weapon system. The process is complex; the team may have limited experience. The program office can only be effective when each member knows his or her role and how it fits in the overall plan. Continuous education is essential.

Recommendation 4. Total Quality Management. The PM should adopt the Total Quality Management principles.

From Henri Fayol to the postwar Japanese economic example, much has been learned in the 20th century about organizational productivity.¹⁶ In the early 1980s, renowned experts such as Deming and Peters began to preach new concepts about quality and motivation.¹⁷ Defense leadership recognized the relevance of these ideas to the weapon acquisition

processes. As a result, DoD's Total Quality Management (TQM) program was initiated. The program consists of ten principles which have been widely acknowledged to enhance organizational productivity.¹⁸ They are:

- Constancy of purpose and mission
- Commitment to quality
- Customer focus
- Process orientation
- Continuous improvement
- Systems centered management
- Investment in knowledge
- Teamwork
- Structure the organization
- Total involvement/participation

By adopting the TQM principles, the PM will improve program stability. The notions of stability enhancement and TQM are very compatible. Stability is concerned with what is being done--the planning and execution functions. TQM addresses how to best do it. The ten TQM principles have the purpose of improving productivity--meeting the user's needs (a short definition of quality) through effective and continuously improved processes. Planning and execution are comprised of numerous processes which benefit from TQM. If this explanation does not satisfy the reader, contrast the 10 TQM principles with the 14 destabilizers in the appendix (page 90). For example, "faulty requirements", "poor cost estimates" and "optimistic schedules" are inconsistent with a "commitment to quality". Likewise, "inadequate skills" and "plan ambiguity" are clearly counter to "investment in knowledge" and "teamwork".

Since much has been written about TQM, the discussion here will be limited to a few key ideas. One is "constancy of purpose and mission"--almost synonymous with "stability". The PM should practice this by continually emphasizing an enduring and limited set of essential program objectives. Every system has them--usually a combination of performance, cost, schedule and support goals. They are the planning cornerstones. The PM should carefully select these objectives based on an accurate understanding of the user's needs.

Moreover, the PM should insist that each team member understands how the system relates to national security. Some may think it to be obvious or trivial; however, I am convinced that too many junior personnel can serve in a program office with an incomplete concept of their system's mission. How can program office personnel make the best micro decisions when they do not understand the macro purpose?

Understanding the program mission and objectives requires focusing on customer needs. For the weapon system program office, the customer is the user and needs are expressed in terms of formal requirements. Creating military capability for the operating forces is the only legitimate reason for a weapon program office to exist. Serving other interests distracts from this purpose. The PM should suspect a problem if the relationship with the user lacks cooperation, frequent communication, or program advocacy during budget reviews. The PM who is interested in stability should instruct program

office personnel to continually solicit feedback from the user. Are requirements understood and will they be satisfied?

Of all the PM's responsibilities, none is more important than "structuring the organization". Acquiring a modern day weapon system is a team effort--far beyond the contributions of a few talented individuals. Management by blind obedience and rigid lines of authority will no longer produce acceptable results. The PM should be very familiar with concepts such as decentralization, organizational integration, internal customer-supplier relationships and problem ownership.

Unlike many other DoD initiatives, TQM does not impose pass or fail criteria, a new procedure, or added reporting; instead, it urges a cultural change--a new way of managing. The acronym "TQM" may not stay fashionable in DoD. However, its precepts mirror contemporary management theory on enhancing quality and productivity. Because of TQM's breadth of impact, it offers to counter the effects of all seven destabilizers which the PM can influence (Figure 4, page 58). The PM should study and adopt TQM as a means to enhance program stability.

Recommendation 5: Contractor Commitment. The PM should discourage buy-ins by creating an environment which rewards those contractors who meet their commitments.

"Buy-in" was described in Chapter III as a contractor tactic of intentionally committing to performance levels which are unlikely to be achieved, with the motive of enhancing the

prospects for AF business. This definition includes unrealistic optimism in both formal proposals and reports or expected system performance which are provided during program execution (see the discussion of "trust me tactics" in Chapter III, page 47, under "Contractor Buy-in"). A buy-in generally ends up with an unfavorable cost, schedule and/or performance variance. Consequently, plan execution is disrupted and the program destabilized. A profit is still possible because the AF frequently renegotiates contracts for unrelated reasons or awards subsequent production to the original developer. Either way, the contractor recovers. Hence, the acquisition process can inadvertently promote the buy-in.

The PM should actively discourage this and can do so in at least five ways, as described below. Each works to motivate industry to meet its commitments. These actions also have the by-product of producing better contractor cost and schedule estimates, mitigating two other destabilizers.

First, the PM should insist on quality user requirements. This is, of course, a repeat of the Recommendation 1 above. As discussed, the characteristics of quality requirements include clarity, completeness and realism. Clarity and realism will enhance the contractor's ability to accurately scope and propose the effort. They will also create the perception that the AF program management is competent enough to recognize buy-in proposals or promises. In addition, the more complete the requirements are, the less probable that

subsequent changes will be needed, reducing opportunities for contractors to renegotiate and recover from a buy-in.

Second, the PM should endeavor to create a program office which is a "quality customer". This will support the parallel objective of obtaining quality suppliers. The program office has great power in providing business opportunities; however, abusing this by arrogance or ignorance will eventually work against the program. Work statements should be rigorously scrubbed of any tasks or data requirements which are not essential except to meet program objectives and constraints of law. Draft solicitations should be used to refine contractual requirements; final solicitations should only be issued with high confidence that the document is in completed form. The program office should not promote bidding contests. Contractors should not be pressured into bids which do not adequately reflect the predicted scope of work.

Moreover, the program office should select contractors based on best value. Contract awards should be influenced less by price and more by proposal quality and the firm's past performance. "Best value" is a key concept of Air Force Systems Command's Contractor Performance Assessment Reporting System (CPARS).¹⁹ The PM should fully support CPARS both in preparing objective contractor performance reports and incorporating past performance as a contractor selection criteria.

Fourth, carefully selected acquisition strategies can discourage buy-ins. Where conditions are appropriate (such as sufficient economic quantity and viable alternative sources) competitive dual sourcing will motivate contractors to meet commitments. Fixed price contracting will do likewise unless, as discussed in Chapter III (see pp. 47-48), the AF initiates frequent changes requiring renegotiation. Award fee incentives which reflect essential program objectives and actual contractor performance will also discourage buy-in.

Finally, the PM must create a relationship with the contractor which values the fulfillment of commitment. Program office personnel must always conduct themselves in a professional manner in both written and spoken communication, creating an atmosphere of mutual respect. All elements of the program plan (see Recommendation #3) should be shared with the contractor team, since understanding is a prerequisite to achieving desired performance. The relationship should accept the legitimate role of the AF program office to oversee the contractor's effort; yet this oversight must not create unnecessary obstacles for the contractor. The program office should religiously meet its commitments. The contractor's fulfilled commitments should be acknowledged and rewarded.

Summary

This chapter has proposed five recommendations for improving stability. Each is within the PM's normal authority

and capability to implement. The list is by no means complete. The PM has a broad range of responsibilities and most actions ultimately have some bearing on the problem. However, these five recommendations, to the degree implemented, will favorably influence the program stability.

Notes

1. Office of the Secretary of Defense, The Defense Budget, FY 1990 Annual Report to Congress (Washington DC: Government Printing Office, 1989), p. 5.

2. Janice Castro, "Making It Better," Time Magazine (November 13, 1989), p. 78.

3. A comprehensive description of systems engineering is the Defense Systems Management College, "Systems Engineering Management Guide," Student course material, Program Managers Course, (December 1986).

4. Further, AFSC policy clearly prohibits the program manager from assuming an advocacy role.

5. In the last decade, many prominent management experts have written on the need for a customer orientation. A recommended reading is Chapter 6, "Close to the Customer" in Tom Peters and Robert H. Waterman, Jr., In Search of Excellence (New York: Warner Books, 1983) pp. 156-99.

6. General Bernard P. Randolph, USAF, "State of Air Force Acquisition," Presentation to Defense Systems Management College, Ft Belvoir, Virginia, 2 May 89, p. 49.

7. Ibid., p. 19.

8. Excellent advice on conducting design reviews is contained in Department of the Navy, Best Practices, NAVSO P-6071 (Washington DC: Government Printing Office, March 1986), pp. 4-75 through 4-80.

9. One of the most common system engineering errors is selecting designs or products before the requirements are sufficiently documented, analyzed and coordinated.

10. For example, prototyping and testing was observed as a key to successful development by The President's Blue Ribbon

Commission on Defense Management, A Report to the President on Defense Acquisition (Washington, DC: Government Printing Office, 1986), p. 13.

11. Promulgated by a memorandum from the Deputy Secretary of Defense, "Improving the Acquisition Process Through Pre-Planned Product Improvements," dated 6 July 1981, P3I is an acquisition strategy based on incorporating growth features into the system. This allows "... an evolutionary and lower technological risk concept ... as a means of reducing unit costs and decreasing acquisition time."

12. For example, this was a major conclusion of the "A3" study. See Air Force Systems Command, "The Affordable Acquisition Approach Study, Executive Summary," Command sponsored study, Andrews AFB MD, 1983, p. 3.

13. Department of Defense, "Test and Evaluation, Directive 5000.3," (Washington DC: Government Printing Office, 12 Mar 86), p. 7.

14. Blue Ribbon Commission, Defense Acquisition pp. 5-9.

15. Tom Peters, Thriving on Chaos (New York: Harper and Row, 1987), p. 620.

16. Henri Fayol, a Frenchman who wrote about management in the 1920s, is considered by many to be the father of management science.

17. Suggested readings are W. E. Deming, "Improvement of Quality and Productivity Through Action by Management," National Productivity Review (Winter 1981-82), pp. 1, 12-22; and Tom Peters and Robert H. Waterman, Jr., In Search of Excellence (New York: Warner Books, 1983).

18. Robert D. Aaron, "Total Quality Management," Program Manager (September-October 1989), p. 17.

19. See Major Steve Nippert, USAF, "CPARS--Contractor Performance Assessment Reporting System," Presentation by HQ AFSC/PKPO, Andrews AFB MD, undated.

20. For the PM, managing contract oversight is a challenge. Program office personnel understandably press for detailed insight into contractor activities. Contractors naturally resist this, perceiving it as a distraction. The PM is often the arbitrator, having to decide the proper balance. Extreme approaches--either micromanagement or laissez-faire--will not work.

CHAPTER V

SUMMARY

. . . without stability, no permanent acquisition improvements are possible.

1
Blue Ribbon Commission

This study answers the question, "How can the Air Force (AF) Systems Command program manager (PM) improve weapon acquisition stability?" Arguments were presented to substantiate the claim that acquisition instability--frequent changes to the plan--is a major weapon procurement problem. Fourteen causes of instability, termed "destabilizers", were identified; and five recommendations presented to improve stability, each within the PM's power to implement.

This final chapter summarizes the key points of the earlier chapters. In addition, at the end is an epilogue, capturing selected observations which are beyond the scope of the problem statement yet of potential interest to those concerned about acquisition stability.

Introduction

Chapter I asserted that a weapon acquisition program is stable if a quality plan is developed and then followed. To elaborate, stability requires two conditions. First, the program is initiated with accurate assumptions concerning user

requirements, resources and schedules. Second, once approved, the assumptions hold and the plan is followed or "executed" in a disciplined manner. In short, the central concept of this study is that stability requires quality planning and disciplined execution.

Program stability does not equate to exhaustive, detailed planning and rigorous, step-by-step execution. Rather, it requires that the essential elements of the plan be accurately estimated and held constant during program execution. Preferably, the list of essential elements should be limited, for example, to a few performance and support values, a funding profile and an operational capability date.

Viewing acquisition in terms of stability is a useful perspective for identifying causes and solutions to acquisition problems. It provides a frame of reference for analyzing the weapon acquisition process. Instability is the common denominator of many acquisition problems.

The study recommends actions which the PM can take to improve stability. Other actors (such as the contractor, headquarters and congress) in the acquisition process also influence program stability. However, the scope of the recommendations is limited to the PM's sphere of influence (except for a short discussion at the end of this chapter).

The Stability Problem

The problem statement assumes that acquisition stability is important. The assumption is a safe one. No new supporting evidence was needed to substantiate it. The ill effects of poor planning and undisciplined execution have been well documented in the last decade. However, Chapter II did reference several studies and expert opinions describing the severity of the problem. Six are briefly summarized below.

A 1979 Rand study was one of the earliest to document acquisition problems in terms of stability. The authors concluded that frequently changing budgets and schedules have² created a serious weapon procurement deficiency.

The 1981 Defense Acquisition Improvement Program also recognized instability to be a significant problem. "Initiative 4" directed the services to "justify" any changes between program baseline funding and current year budget³ recommendations.

In 1983, the Affordable Acquisition Approach was sponsored by AFSC to investigate a perception that programs were taking longer and costing more. It concluded "that program instability (large unplanned changes in program funding and/or schedule)⁴ is the major causative factor of cost and schedule growth."

President Reagan established a Blue Ribbon Commission on Defense Management in 1986 for the purpose of suggesting improvements to the DoD's acquisition process. The Commission

strongly criticized DoD program instability. It suggested that DoD "emulate" the stability of "outstanding commercial programs".⁵

In February, 1989, the Secretary of Defense was directed by a National Security Review (NSR-11) to complete a plan for improving the acquisition process. NSR-11 specifically urges "Stable program funding and management using agreed cost, schedule and performance baselines. . . ."⁶

Secretary Cheney responded to NSR-11 four months later with the Defense Management Report (DMR). The DMR established stability as a management principle which will guide DoD acquisition reform.⁷

Chapter II concluded by summarizing five consequences of instability:

- added weapon system costs
- added acquisition time
- business strategies rendered ineffective
- lost confidence by public and program team members
- reduced military capability

The Causes of Instability

Chapter III identified major causes of instability. While it was impractical to address every conceivable one, fourteen considered to be the most documented were included. For completeness, no attempt was made to limit the list to only those "destabilizers" which are within the PM's influence.

The fourteen destabilizers were organized using a model (see Chapter III, Figure 3, page 24). Each was categorized as either a threat to planning or to execution. Planning and execution were further divided into sub-functions. Figure 5 lists the fourteen as organized in the model. For a short description of each destabilizer, refer to the appendix on page 90.

<u>function</u>	<u>sub-function</u>	<u>destabilizer</u>
planning	requirements definition	faulty requirements changing threat
	resource estimating	strategy disconnects poor cost estimates
	scheduling	optimistic schedules concurrency
execution	organizing	inadequate skills reporting requirements
	coordinating	floating baselines plan ambiguity
	directing	micromanagement distraction
	controlling	contractor buy-in changing budgets

Figure 5: Fourteen Destabilizers. A model presented in the third chapter grouped destabilizers by management function/sub-function.

Recommendations

Five recommendations for reducing or eliminating specific destabilizers were presented. Figure 4 of Chapter IV (page 58) shows the relationships, each recommendation having an

antidotal affect on three or more of the destabilizers. The PM can influence seven of the fourteen. The remaining destabilizers are caused by forces external to the PM's control.

The five recommendations are briefly summarized below.

Recommendation 1. Quality Requirements. The PM should pursue early requirements definitization and validation; and consult often with the user on this subject.

Requirements are the foundation of an acquisition program. Stable programs need quality requirements--that is, accurate descriptions of the characteristics needed to counter the threat. The user is the source of operational requirements. The PM should focus the program team on user satisfaction. Program stability will be improved if the PM values quality requirements.

Recommendation 2. Realistic Estimates. The PM should create realistic cost and schedule estimates.

AF acquisition managers have a bias towards optimism. However, optimistic estimates are not compatible with stability. If the management doctrine teaches quality planning and disciplined execution, then estimates should reflect objective cost and schedule predictions. Programs with realistic planning estimates will have the best chances for stable execution.

Recommendation 3. Plan Education. The PM should continuously educate the team members on the contents of the

plan. Moreover, an informal baseline should be developed for this purpose.

"Team members", defined as program office, contractor and user representative personnel, can have an unacceptably limited understanding of the plan. The solution is for the PM to continuously educate team members. One specific technique is to create an "informal baseline" in the form of a nominal one hour briefing. It should explain the top level integration of all planning elements and provide a vision of how the program will be executed. The best managers do not direct--they explain. The PM has much to explain in the course of leading the program team to acquire a weapon system.

Recommendation 4. Total Quality Management. The PM should adopt the Total Quality Management (TQM) principles.

The DoD TQM program consists of management principles which have been widely acknowledged to enhance organizational productivity. The notions of stability enhancement and TQM are very compatible. Stability is concerned with what is being done--the planning and execution functions. TQM addresses how to best do it and concentrates on continuously improving processes. Planning and execution are comprised of numerous processes which benefit from TQM.

Recommendation 5: Contractor Commitment. The PM should discourage buy-ins by creating an environment which rewards those contractors who meet their commitments.

A "buy-in" is described as a contractor strategy for furthering the prospects of future AF business. Two categories of buy-in were defined: "optimistic proposals" and "trust me tactics". In either case, the usual effect of a buy-in is that the program ends up with an unfavorable cost, schedule or performance variance. Consequently, plan execution is disrupted and the program destabilized. The PM should actively discourage buy-ins by creating the proper environment and incentives.

Epilogue

No recommendations were provided to correct seven of the fourteen destabilizers. These seven are, for all practical purposes, outside of the PM's realm of influence and consequently not within the scope of this study. Figure 6 divides the destabilizers into the two groups. Although beyond scope, a short concluding analysis of external destabilizers--those beyond the PM's control--is worthwhile.

<u>PM can influence</u>	<u>beyond PM's control</u>
faulty requirements	changing threat
poor cost estimates	strategy disconnects
optimistic schedules	reporting requirements
concurrency	floating baselines
inadequate skills	micromanagement
plan ambiguity	distraction
contractor buy-in	changing budgets

Figure 6: Destabilizer Groupings. Fourteen destabilizers are divided into two groups: those within and those beyond the PM's power to influence.

Changing Threat. Threats are established by intelligence community assessments and user priorities. The program must be responsive to the threat, even if stability is eroded. However, the user should be careful not to haphazardly redefine the threat, in other words, do it without carefully considering the impacts of the resulting instability.

Reporting Requirements, Micromanagement, Distraction. These external destabilizers have been thoroughly documented. Their origins are usually well intentioned policies or legislation but the result is reduced management effectiveness. Each is contrary to decentralized execution--widely recognized as the most effective organizational approach. While much has been written about these problems, they continue to persist. Perhaps three adages, authors unknown, characterize these destabilizers:

Everyone is for decentralization, from themselves up.

Good management cannot be legislated.

A bureaucracy's greatest challenge is self-reform.

Strategy Disconnects, Floating Baselines, Changing Budgets. Strategy disconnects, floating baselines and changing budgets are all related to the process in which resources are allocated. By far, the erratic nature of the planning, programming and budgeting process is the most documented cause of instability. Ideally, DoD investments should be carefully planned in advance but in reality the process is turbulent. A crisis such as the passing of a budget deadline is often

required to force action. Fiscal year 1990 was unfortunately typical: numerous weapon priority issues between the DoD and congress, adjustments to virtually every weapon program, and an appropriation bill enacted long after the start of the fiscal year. No commercial venture could operate profitably in this manner for very long. The significant waste of defense acquisition stems from these and the other destabilizers--not corruption or over priced spares.

The external destabilizers have been thoroughly studied, documented and acknowledged by recognized authorities both in and out of government. There are a number of initiatives, such as the total quality management program and the Defense Management Report which provide hope for positive change. However, for the near term, external factors will continue to induce instability, even if the PM successfully implements all of the study recommendations. Nonetheless, stability is not an all or nothing proposition; it is a matter of degree. The PM will not achieve total stability, but he or she can improve it--with tangible benefits.

What we have learned is that it is not difficult to suggest (acquisition) reform, but actually implementing reform appears to be a problem.

8

Les Aspin

Notes

1. U.S. Senate, Committee on Armed Services, The Acquisition Findings in the Report of the President's Blue Ribbon Commission on Defense Management (Washington, D.C.: Government Printing Office, April 4, 1986), p. 32.

2. Edmund Dews and Giles K. Smith, Acquisition Policy Effectiveness: Department of Defense Experience in the 1970s (Santa Monica: Rand Corporation, Santa Monica, 1979), p. 71.

3. William A. Long, "Final Report of the Task Force on Acquisition Improvement," (DoD Report, Office of the Under Secretary of Defense, Research and Engineering, Washington DC, 1981), p. 2.

4. Air Force Systems Command, "The Affordable Acquisition Approach Study, Executive Summary," Command sponsored study, Andrews AFB MD, 1983, p. 3.

5. The President's Blue Ribbon Commission of Defense Management, A Report to the President on Defense Acquisition (Washington, DC: Government Printing Office, 1986), p. 12.

6. "National Security Review (NSR-11) Summary," DoD white paper, undated, p. 2.

7. Dick Cheney, Defense Management Report to the President (Washington, DC: Government Printing Office, July 1989), p. 10.

8. Les Aspin is Chairman, House Armed Service Committee and was quoted by Larry Grossman, "Competitive, Complex, Controversial," Government Executive, (May 1989), p. 23.

APPENDIX
FOURTEEN DESTABILIZERS

Faulty requirements: Requirements which are unrealistic, overstated, hedged or ambiguous.

Changing threat: A revision to the threat assessment which necessitates a modification to the approved plan.

Strategy disconnects: The absence of long term agreement between and within the executive and legislative branches over weapon acquisition priorities and hence resource allocations.

Poor cost estimates: Cost estimates which not reliable or complete.

Optimistic schedules: Predictions of task completion times which are consistently understated.

Concurrency: Failure to schedule sufficient time to conduct IOT&E prior to the production decision.

Inadequate skills: Less than desirable experience or training among AF acquisition personnel.

Reporting requirements. Long command channels and top heavy staff structure which inhibits responsive problem resolution and decision making.

Floating baselines. Commitments for resource allocation or management performance which are changing or unfulfilled.

Plan ambiguity. A inadequate understanding of the acquisition plan among program team members.

Micromanagement: Inappropriate management of program details by higher levels of bureaucracy.

Distraction: Bureaucratically imposed requirements which consume and divert the resources of the program team from higher priority tasks.

Contractor buy-in: Optimistically projecting performance in order to improve the prospects for future AF business.

Changing budgets: Changes to the planned funding profile.

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GLOSSARY

A3	affordable acquisition approach
AF	air force
AFSC	Air Force Systems Command
CINC	commander in chief
CPARS	contractor performance assessment reporting system
DAE	Department of Defense acquisition executive
DAIP	defense acquisition initiatives program
DMR	defense management report
DoD	Department of Defense
DODD	Department of Defense directive
DODI	Department of Defense instruction
DOT&E	Director, Operational Test and Evaluation
FY	fiscal year
HQ USAF	Headquarters, United States Air Force
ICBM	intercontinental ballistic missile
IOT&E	initial operational test and evaluation
JCS	Joint Chiefs of Staff
MYC	multiyear contracting
MS	milestone
MX	Missile Experimental
NATO	North Atlantic Treaty Organization
NSR	national security review
OSD	Office of the Secretary of Defense
P3I	preplanned product improvement
PB	president's budget
PEO	program executive officer
PM	program manager
PMP	program management plan
RDT&E	research, development, test and evaluation
SAE	service acquisition executive
T&E	test and evaluation
TQM	total quality management